Baseline Human Health Risk Assessment

Waste Water Treatment Plant 1
Plum Brook Ordnance Works
Sandusky, Ohio

Prepared for:

U.S. Army Corps of Engineers
P.O. Box 1070
Nashville, Tennessee 37202-1070

Prepared by:

Shaw Environmental & Infrastructure, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

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List of Acronyms

ABS	dermal absorption factor
AF	soil-to-skin adherence factor
AP1	Ash Pit 1
bgs	below ground surface
BHHRA	baseline human health risk assessment
BSC	background screening concentration
BTEX	benzene, toluene, ethylbenzene, and xylenes
CDI	chronic daily intake
cm/hour	centimeters per hour
cm^2	square centimeter
COPC	chemical of potential concern
CSEM	conceptual site exposure model
°F	degrees Fahrenheit
DA	dose absorbed per unit body surface area per day
D&M	Dames and Moore, Inc.
DM	dry matter
DNT	dinitrotoluene
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
EPC	exposure-point concentration
ET	exposure time
FI	fractional term
GAF	gastrointestinal absorption factor
gpm	gallons per minute
g	gram
g/kg-day	grams per kilogram of body weight per day
g/m^3	grams per cubic meter
HHEM	human health evaluation manual
HI	hazard index
HQ	hazard quotient
ICI	International Consultants Incorporated
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	incremental lifetime cancer risk
IRIS	Integrated Risk Information System

List of Acronyms *(Continued)*

IT	IT Corporation
kg	kilogram
kg/day	kilograms per day
LBA	Locomotive Building Area
LMS	linearized multistage
K_p	permeability coefficient
L/cm^3	liters per cubic centimeter
L/day	liters per day
LSI	limited site investigation
m^3	cubic meter
m^3/day	cubic meters per day
m^3/hr	cubic meters per hour
m^3/kg	cubic meters per kilogram
m/second	meters per second
MDC	maximum detected concentration
$\mu g/m^3$	micrograms per cubic meter
mg/cm^2	milligrams per square centimeter
mg/cm^2-day	milligrams per square centimeter per day
mg/m^3	milligrams per cubic meter
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/kg-day	milligrams per kilogram per day
µg/L	micrograms per liter
mg/L	milligrams per liter
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OEPA	Ohio Environmental Protection Agency
PAH	polycyclic aromatic hydrocarbon
PBOW	Plum Brook Ordnance Works
PEF	particulate emission factor
ppm	parts per million
PRG	preliminary remediation goal
QC	quality control

List of Acronyms *(Continued)*

RBSC	risk-based screening concentration
RfC	reference concentration
RfD	reference dose
RI	remedial investigation
RME	reasonable maximum exposure
RSL	regional screening level
SF	cancer slope factor
Shaw	Shaw Environmental, Inc.
TNT	trinitrotoluene
TNTA	TNT Area A
TNTB	TNT Area B
TNTC	TNT Area C
UCL	95th percent upper confidence limit on the arithmetic mean
UF	uncertainty factor
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound
WRS	Wilcoxon Rank Sum
WWTP1	Waste Water Treatment Plant 1

Executive Summary

A baseline human health risk assessment (BHHRA) was conducted to evaluate risks associated with exposure to soil, groundwater, surface water and sediment at Waste Water Treatment Plant 1 (WWTP1) at the Plum Brook Ordnance Works (PBOW) in Sandusky, Ohio. The approach used in the BHHRA is consistent with methodologies described in the U.S. Environmental Protection Agency's primary risk assessment guidance documents, the site-specific work plan, and discussions and agreements between the Ohio Environmental Protection Agency, the U.S. Army Corps of Engineers Nashville and Huntington Districts, and Shaw Environmental, Inc.

Site History/Description. The PBOW facility was constructed on property comprising 9,009 acres in early 1941 as a manufacturing plant for 2,4,6-trinitrotoluene (TNT), 2,4-dinitroluene (DNT), and pentolite. Production of explosives at PBOW began in December 1941 and continued until 1945. It is estimated that more than 1 billion pounds of nitroaromatic explosives were manufactured during the 4-year operating period. After plant operations ceased, the manufacturing process lines were decontaminated by the Army in late 1945. After the property was certified as decontaminated, 3,280 acres of the property were initially transferred to the Ordnance Department, then to the War Assets Administration. In 1949, PBOW was transferred to the General Services Administration. The Department of the Army reacquired the 3,230 acres in 1954 and performed cleanup efforts from the mid-1950s until 1963.

Accountability and custody for the entire portion of the former PBOW property that had been under the accountability and custody of the Department of the Army were transferred to the National Aeronautics and Space Administration (NASA) on March 15, 1963. NASA performed further decontamination efforts during 1964. NASA has operated and maintained the former PBOW property since 1963, and the facility is currently the NASA Glenn Research Center, Plum Brook Station. NASA operates the property as a space research facility in support of their Glenn Research Center at Lewis Field, Cleveland, Ohio. Most of the aerospace testing facilities built in the 1960s at the site are currently on standby or inactive status.

WWTP1 is located in the north central portion of the PBOW facility. During PBOW manufacturing operations 1941 to 1944, WWTP1 received TNT manufacturing wastes from TNT Area A and TNT Area B through wooden waste water sewer lines for treatment. Chemical contamination that may have resulted from operations at WWTP1 are expected to be primarily nitroaromatics, volatile organic compounds, semivolatile organic compounds, and metals.

Approach. The BHHRA evaluated exposure to chemicals in bedrock groundwater, overburden groundwater, surface soil, subsurface soil, surface water, and sediment for cancer risks and noncancer hazards. Only validated analytical data were used in the BHHRA. Validated analytical data are from samples collected during 2008 and 2009, as reported in the site characterization report, and those collected in 1999 and reported in the limited site investigation report.

A screening for chemicals of potential concern (COPC) was used to focus the evaluation on those chemicals most likely to present a risk to potentially exposed individuals. This screening included a risk-based and, for inorganic chemicals in soil and bedrock groundwater, a background screening. This background screening protocol, which is based on PBOW Project Delivery Team agreement, differs somewhat from the current Ohio Environmental Protection Agency guidance.

Each COPC in each medium was evaluated for exposure via the relevant exposure pathways and the resultant risk and hazards were estimated. One or more COPCs were found in each WWTP1 environmental medium except for surface water, indicating that WWTP1 surface water does not contribute significantly to risks. The receptors listed below were evaluated for exposure to the COPCs and their associated hazards and risks. The media evaluated for each receptor are shown in parentheses. Although no COPCs were found in surface water, this medium is still regarded as evaluated.

- Current groundskeeper (surface soil)
- Future groundskeeper (combined surface and subsurface soil [referred to as "total soil"], bedrock groundwater, overburden groundwater)
- Indoor worker (surface soil, subsurface soil [air pathway only], bedrock groundwater, overburden groundwater)
- Construction worker (total soil, surface water, sediment)
- On-site resident (total soil, surface water, sediment, bedrock groundwater, overburden groundwater)
- Hunter (surface soil)
- Hunter's child (surface soil [venison pathway only]).

Note that there is currently no groundskeeper at WWTP1, but the current groundskeeper is included because current land use does not prohibit the presence of a groundskeeper or other

on-site workers. Even though hunting is not currently permitted at WWTP1, hunting is permitted in other areas within PBOW; therefore, future use of WWTP1 for hunting is evaluated in this BHHRA. No construction is planned for WWTP1, but a construction worker is assumed to be potentially exposed under current or future land use. The future groundskeeper, indoor worker, and resident are evaluated for future land use; these three receptors are also evaluated assuming groundwater use as potable water. Overburden groundwater and bedrock groundwater are evaluated for each receptor separately.

Results/Conclusions. Risks were characterized for each COPC identified in each medium for the relevant receptors. Noncancer hazards were evaluated against a target hazard index (HI) criterion of 1 and the PBOW team target incremental lifetime cancer risk (ILCR) goal of 1E-5 (i.e., 1 additional incidence of cancer per 100,000 individuals exposed). Cancer risk results are also compared to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) acceptable cancer risk range of 1E-6 to 1E-4 (i.e., a rate of 1 additional incidence of cancer per 1,000,000 to 1 in 10,000 individuals exposed), which is referred to herein as the "NCP risk management range."

The overall HI and ILCR values are summarized in the following bullets; exceedances of the PBOW cancer risk goal (ILCR>1E-5) are shown as bold and exceedances of the noncancer hazard criterion (HI>1) or the NCP risk management range (1E-6 to 1E-4) are shown as bold italics:

- Current groundskeeper: ILCR = 2E-6; HI = 0.07
- Future groundskeeper – all pathways, assuming bedrock groundwater use: ***ILCR = 8E-4; HI = 6***
- Future groundskeeper – all pathways, assuming overburden groundwater use: **ILCR = 4E-5**; HI = 0.4
- Future groundskeeper – all pathways, excluding groundwater use: ILCR = 3E-6; HI = 0.08
- Indoor worker – all pathways, assuming bedrock groundwater use: ***ILCR = 8E-4; HI = 6***
- Indoor worker – all pathways, assuming overburden groundwater use: **ILCR = 4E-5**; HI = 0.4
- Future indoor worker – all pathways, excluding groundwater use: ILCR = 5E-7; HI = 0.03

- Construction worker: ILCR = 1E-7; HI = 0.2
- Resident – all pathways, assuming bedrock groundwater use: ***ILCR = 4E-3***; ***child HI = 74***; ***adult HI = 32***
- Resident – all pathways, assuming overburden groundwater use: ***ILCR = 2E-4***; ***child HI = 3***;
  adult HI = 1
- Resident – all pathways, excluding groundwater use: ILCR = 8E-6; child HI = 0.8; adult HI = 0.09
- Hunter: ILCR = 1E-7; HI = 0.004
- Hunter's child: ILCR = 2E-11; HI = 0.000006.

The ILCR of the WWTP1 future groundskeeper, indoor worker, and resident hypothetically assumed to use bedrock groundwater as tap water exceeds the NCP risk management range as well as the PBOW target cancer risk goal. The HI values of these receptors, if assumed to use either the bedrock or overburden groundwater as a potable source, also exceed the target criterion of 1, indicating that adverse human health risks cannot be regarded as unlikely to occur under these hypothetical scenarios. Cancer risks and noncancer hazards to all other potential WWTP1 receptors evaluated under current or future land use are within or less than the NCP risk management range, are less than or equal to the target HI goal, and are less than the PBOW cancer risk goal, indicating that cancer risks are at acceptable levels and adverse noncancer effects are unlikely to occur under these potential current or future scenarios. These conclusions also apply to the future groundskeeper, indoor worker, and resident not assumed to use bedrock or overburden groundwater. Note that even though the current full-time groundskeeper is used to represent a maximum exposure under current potential land use (i.e., NASA control), groundskeeping activities at WWTP1 appear to be limited to the far eastern portion of the site which is mowed a few times per year; more frequent mowing occurs along the road.

The cancer risks and noncancer hazards associated with bedrock groundwater are nearly entirely attributable to natural petroleum-related compounds and arsenic. The cancer risks associated with overburden groundwater are mostly due to arsenic in one sample from upgradient well WWTP1-MW01; arsenic in this sample does not appear to be associated with former site activities. Use of either the overburden or bedrock groundwater is regarded as implausible because of insufficient yield. Additionally, the naturally poor quality of the bedrock groundwater and associated hydrogen sulfide off-gassing make it unsuitable as a potable source. The readily

available municipal water supply obviates the need for use of groundwater as a potential source of tap water in the general vicinity of PBOW.

If the contributions of exposure to groundwater are appropriately excluded, none of the WWTP1 receptors had ILCRs or HIs that exceed the PBOW target values (ILCR$\leq$1E-5; HI$\leq$1) or the NCP risk management range (1E-6 to 1E-4). This indicates that the associated environmental media at WWTP1 are unlikely to pose an unacceptable cancer risk to any receptor, and that exposure to these media is unlikely to result in adverse noncancer health effects for any human receptor. Because groundwater use is not regarded as plausible based on insufficient yield in both the overburden and bedrock units, the risks associated with WWTP1 groundwater are accordingly implausible. The naturally poor quality of the WWTP1 bedrock groundwater further increases the implausibility of bedrock groundwater use.

1.0 Introduction

This baseline human health risk assessment (BHHRA) evaluates potential human health risks associated with exposure to soil, groundwater, surface water, and sediment associated with Waste Water Treatment Plant 1 (WWTP1) at the former Plum Brook Ordnance Works (PBOW), Sandusky, Erie County, Ohio. This work is being conducted for the U.S. Army Corps of Engineers (USACE) under the Defense Environmental Restoration Program-Formerly Used Defense Sites, managed by the USACE Huntington District, and technically overseen by the USACE Nashville District.

This BHHRA is consistent with U.S. Environmental Protection Agency (EPA) guidance and with the procedures established in the BHHRA for TNT Area A (TNTA) and TNT Area C (TNTC) soil (IT Corporation [IT], 2001a), the BHHRA for groundwater at PBOW (Shaw Environmental, Inc. [Shaw], 2006) and, most specifically, the WWTP1 BHHRA work plan (Shaw, 2009).

In this BHHRA, the term “facility” refers to the entire former PBOW property, and the term “site” refers to areas within PBOW under investigation, in this case WWTP1.

1.1 Facility Location and Description

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

1.2 Facility History and Background

The PBOW facility was constructed on property comprising 9,009 acres in early 1941 as a manufacturing plant for 2,4,6-trinitrotoluene (TNT), 2,4-dinitroluene (DNT), and pentolite (International Consultants Incorporated [ICI], 1995). Production of explosives at PBOW began in December 1941 and continued until 1945. It is estimated that more than 1 billion pounds of nitroaromatic explosives were manufactured during the 4-year operating period. The three

explosive manufacturing areas were designated TNTA, TNT Area B (TNTB), and TNTC. Twelve process lines were used in the manufacture of TNT: four lines at TNTA, three lines at TNTB, and five lines at TNTC.

After plant operations ceased, the manufacturing process lines were decontaminated by the Army in late 1945. During decontamination, all structures, equipment, and manufacturing debris were either removed and salvaged or removed and burned. After the property was certified as decontaminated, 3,230 acres of the property were initially transferred to the Ordnance Department, then to the War Assets Administration. In 1949, PBOW was transferred to the General Services Administration. This transfer did not include the Plum Brook Depot area, which consists of 2,800 acres. The Department of the Army reacquired the 3,230 acres in 1954. In 1955, the Army completed further decontamination of the manufacturing process lines. This effort included removal of contaminated surface and subsurface soil around the building and wooden and ceramic waste disposal lines containing TNT. Thousands of pounds of TNT were discovered in catch basins; this TNT was removed and burned at the burning grounds. The Army continued cleanup efforts until 1963.

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

NASA has operated and maintained the former PBOW property since 1963, and the facility is currently the NASA Glenn Research Center, Plum Brook Station. NASA operates the property as a space research facility in support of their John Glenn Research Center at Lewis Field, Cleveland, Ohio. Most of the aerospace testing facilities built in the 1960s at the site are currently on standby or inactive status. On April 18, 1978, NASA declared approximately 2,152 acres of PBOW as excess. This excess included former buffer areas that had not been used by the

Army and were thus not subject to decontamination efforts. The Perkins Township Board of Education acquired 46 acres of the excess acreage and uses this area as a bus transportation area. The General Services Administration retains ownership of the remaining excess acreage and currently has a use agreement with the Ohio National Guard for 604 acres of this land. The details of land transactions are listed in the site management plan (ICI, 1995).

1.3 WWTP1 Description and History

The former WWTP1 is located in the north-central portion of PBOW, approximately 200 feet northwest of the intersection of Maintenance Road and Taylor Road, and comprises approximately 2 acres (Figure 1-2). During PBOW manufacturing operations from 1941 to 1944, WWTP1 received TNT manufacturing wastes from TNTA and TNTB through wood-stave waste water sewer lines for treatment and disposal (ICI, 1995). The purpose of the treatment plants was to reduce the volume of waste water discharged from each of the manufacturing areas to the waste water ponds. The waste water that was transferred and received from the TNT manufacturing areas consisted of spent sulfuric acid and nitric acids and red water from the TNT purification process. Chemicals in the waste streams included sodium salts of sulfite, sulfate, nitrite, nitrate, sulfonates of unwanted TNT isomers, trinitrobenzoic acid, trinitrobenzaldehyde, trinitrobenzyl alcohol, nitrotoluenes, and dinitrotoluenes (D&M, 1996).

WWTP1 consisted of a raw waste storage tank, caustic storage tank, neutral storage tank, an equalization tank, a condensate storage tank, an evaporator building, an incinerator, and a thick liquid storage tank. The plants received a waste water slurry from the TNT manufacturing settling basins and neutralized the slurry through a chemical depuration process. The liquid was discharged to open ditches or ponds surrounding the facilities or thickened by evaporation. The thickened liquid was then incinerated. The incinerators were located to the east of the storage tanks at WWTP1. Ash from the WWTP1 incinerator was disposed of in Ash Pit 1 (AP1).

Limited investigation had been conducted at WWTP1 prior to the remedial investigation (RI) effort (Shaw, 2011a). Historical drawings were reviewed by D&M (1995), when it was determined that the raw waste storage tank located at the former WWTP1 received waste from the settling basins located at manufacturing areas TNTA and TNTB. During a field reconnaissance in March 1999, bare areas and the remains of concrete foundations were reported to have been observed where the former buildings and storage tanks were once present (USACE, 2000). A limited site investigation (LSI) performed in 2000 recommended additional investigation of WWTP1 due to the presence of nitroaromatics in two soil samples (USACE, 2000).

The topography of WWTP1 is essentially flat with a slight sloping gradient of less than 5 feet toward the north and west (USACE, 2000). Two drainage ditches are associated with WWTP1, one located to the north and one to the west. Except during precipitation events, these ditches usually contain little or no water. These ditches converge northwest of WWTP1 and drain toward the north/northwest, into an unnamed tributary to Plum Brook.

WWTP1 is covered with a variety of vegetation types. In the far eastern portion of the site some mowing appears to occur, but based on the overgrown nature of the site, not more than a few times per year. More frequent mowing occurs immediately along the road. The remainder of WWTP1 contains a mosaic of upland old field and dense shrub thicket dominated by gray dogwood (*Cornus racemosa*). The old field portions of the site contain a variety of grasses and herbs. Scrub/shrub wetland vegetation occurs along the ditch located along the northern border of the WWTP1 study area.

1.4 Groundwater Use and Site Use

Two groundwater aquifer systems are utilized for drinking water in the region: a carbonate aquifer to the west and a shale aquifer to the east (Shaw, 2005). PBOW is located within the transition of the two systems. Upwards of 170 private drinking water wells permitted by the Erie County Health Department are located within 4 miles of PBOW. Groundwater is not used on the PBOW facility. Permits are not required for agricultural wells. The Erie County Health Department does not permit using surface water as private drinking water. A shallow discontinuous and variably saturated groundwater system exists within the unconsolidated material atop the bedrock under much of the site.

Current use of the PBOW facility is classified as industrial for the purpose of identifying plausible human receptors and exposure pathways for evaluation in the BHHRA. D&M (1997) describes potential future uses of all or portions of the facility as follows:

- Industrial use (NASA activities and programs) may continue.
- Portions of the site may be used for recreation by hunters and fishermen.
- Portions of the site may be sold to state or local government or private individuals (no land-use restrictions were mentioned).
- Parts of the facility may be used in the future for residential or agricultural purposes.
- Parts of the facility may be used for training by the National Guard.
- Construction activities may be performed during development of any of the sites.

In summary, future site uses of WWTP1 are considered to be industrial or residential for the purpose of developing receptor and exposure scenarios. There are no current NASA activities at WWTP1, but because PBOW is under NASA control, the potential for NASA activities at WWTP1 exists. Even though hunting is not currently permitted at WWTP1, hunting is permitted in other areas within PBOW; therefore, future use of WWTP1 for hunting is evaluated in this BHHRA. It is conservatively assumed for purposes of this BHHRA that groundwater may be developed as a source of potable water in the future. Refer to Section 3.1.3 for a discussion of receptors and exposure scenarios.

1.5 Protocol for the Baseline Human Health Risk Assessment

The BHHRA was performed consistent with the WWTP1 BHHRA work plan (Shaw, 2009). The WWTP1 BHHRA work plan was developed consistent with previous PBOW BHHRAs and is based on EPA, USACE, and Ohio Environmental Protection Agency (OEPA) guidance, including, but not limited to, the following:

- Ohio Environmental Protection Agency (OEPA), 2009a***, Use of U.S. EPA's Regional Screening Levels as Screening Values in Human Health Risk Assessments***, Technical Decision Compendium, Division of Emergency and Remedial Response, August.

- Ohio Environmental Protection Agency (OEPA), 2009b***, Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for the DERR Remedial Response Program***, Technical Decision Compendium, Division of Emergency and Remedial Response, August.

- U.S. Army Corps of Engineers (USACE), 1999, ***Risk Assessment Handbook, Volume I: Human Health Evaluation***, Engineer Manual EM 200-1-4.

- U.S. Environmental Protection Agency (EPA), 1989a, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002.

- U.S. Environmental Protection Agency (EPA), 1991a, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance, Standard Default Exposure Factors***, Interim Final, Office of Solid Waste and Emergency Response, OSWER Directive: 9285.6-03.

- U.S. Environmental Protection Agency (EPA), 1992, ***Guidance on Risk Characterization for Risk Managers and Risk Assessors***, Memorandum from F. Henry Habicht II, Deputy Administrator, to Assistant Administrators, Regional Administrators, February.

- U.S. Environmental Protection Agency (EPA), 1997a, ***Exposure Factors Handbook***, Office of Research and Development, National Center for Environmental Assessment, Washington, D.C., EPA/600/P-95/002Fa, August.

- U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

- U.S. Environmental Protection Agency (EPA), 2004a, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

- U.S. Environmental Protection Agency (EPA), 2010a, ***ProUCL Version 4.00.05***, Office of Research and Development, Technology Support Center Characterization and Monitoring Branch, Las Vegas, Nevada, February, on line at http://www.epa.gov/esd/tsc/form.htm.

- U.S. Environmental Protection Agency (EPA), 2010b, ***ProUCL Version 4.00.05 Technical Guide***, Draft, Office of Research and Development, Technology Support Center Characterization and Monitoring Branch, Las Vegas, Nevada, EPA/600/R-07/041, May.

- U.S. Environmental Protection Agency (EPA), 2010c, ***ProUCL Version 4.00.05 User Guide***, Draft, Office of Research and Development, Technology Support Center Characterization and Monitoring Branch, Las Vegas, Nevada, EPA/600/R-07/038, May.

1.6 Report Organization

The remainder of this document is organized as follows:

- ***Chapter 2.0, Data Evaluation.*** Identifies data sources, evaluates data quality, identifies chemicals of potential concern (COPC), and provides a background screening and evaluation protocol. It is noted that the background screening protocol differs from the current OEPA (2009c) guidance as explained in Section 2.4.3.

- ***Chapter 3.0, Exposure Assessment.*** Presents a conceptual site exposure model (CSEM), including contaminant sources, contaminant release mechanisms, receptors, and exposure pathways; describes exposure-point concentrations (EPC); and presents methods for calculating chemical intake and contact rates.

- ***Chapter 4.0, Toxicity Evaluation.*** Describes the potential for cancer and/or noncancer human health effects, provides an estimate of the quantitative relationship between the magnitude of dose or contact rate and the probability and/or severity of adverse effects, identifies the toxicity values that are used in the BHHRA, and describes the development of dermal toxicity values.

- ***Chapter 5.0, Risk Characterization.*** Combines the output of the exposure assessment and toxicity assessment to quantify the risk to each receptor at each site. Risks associated with exposure to all appropriate media for each site are evaluated.

- ***Chapter 6.0, Uncertainty Analysis.*** Identifies uncertainties in all phases of the BHHRA and discusses their individual effects on the risk assessment results, generally focusing on those issues that are most pertinent to the risk WWTP1 BHHRA and those likely to have the greatest effect on risk estimates.

- ***Chapter 7.0, Summary and Conclusions.*** Provides a brief summary of the BHHRA, including quantitative results, uncertainties, and pertinent site information. Summary and discussion is focused on those results and issues that are most directly relevant to the risk assessment conclusions for WWTP1.

- ***Chapter 8.0, References.*** Presents the references used in the preparation of this document.

2.0 Data Evaluation

Data evaluation consists of a description of the appropriate data sources for each environmental medium sampled for each site, a discussion of data quality, a description of the methodology used for identification of the COPCs, and a summary of the COPCs for each WWTP1 environmental medium.

2.1 Data Sources

All soil, groundwater, sediment, and surface water samples from which the validated analytical data used in the BHHRA were derived are presented in Table 2-1. These data include surface soil, subsurface soil, surface water, sediment, overburden groundwater, and bedrock groundwater well samples. The sample summary table identifies each sample used in the BHHRA and the associated analytical suite. Samples included those collected as part of the LSI for WWTP1 (USACE, 2000), and the RI samples (Shaw, 2011a). All WWTP1 sampling locations are shown on Figure 2-1.

2.2 Sorting the Analytical Data

Prior to initiation of BHHRA calculations, a database of chemicals present in site samples was compiled for each environmental medium. This database includes all chemicals detected as described in the RI report (Shaw, 2011a) and the LSI report (USACE, 2000). The surface soil and subsurface soil are considered separate media. Surface and subsurface soil data are typically combined to assess exposures under the construction worker, future groundskeeper, and residential site-use scenarios, which would likely occur after surface and subsurface soil had been excavated and/or mixed. Combined surface and subsurface soil data are termed “total soil” in the BHHRA. However, it is understood that a reference to the evaluation of exposure to total soil is actually an evaluation of exposure to both surface soil and subsurface soil. The total soil COPC list is created by combining the list of COPCs identified in surface and subsurface soil. If a chemical is either a surface soil COPC or a subsurface soil COPC (or both), then that chemical is a total soil COPC. The EPCs for total soil are typically generated from the combined data sets.

Generally, surface soil is defined as samples collected from within the interval of 0 to 1 foot below ground surface (bgs), and subsurface soil is defined as samples collected from depths greater than 1 foot bgs per the RI work plan (Shaw, 2008a). The LSI (USACE, 2000) historical surface soil samples were collected from a depth of 0.5 to 0.1 foot bgs. However, during the RI, it was observed that WWTP1 was covered with up to 2.6 feet of the sandy fill material. This sandy material likely comprised most of the soil sampled during the LSI. Therefore, the RI

surface soil samples were collected from the native material below the fill. The work plan called for subsurface soil samples to be collected at depths of 3 to 5 and 8 to 10 feet bgs. However, the shallower subsurface interval was adjusted to a target range of 5 to 7 feet bgs because of the presence of the sandy fill. The interval for the deepest soil samples was kept at 8 to 10 feet bgs.

LSI surface soil sample PBOW99SSW108 and its duplicate PBOW99SSW110 yielded questionable results for TNT. A concentration of 0.6 milligram per kilogram (mg/kg) was reported for the original PBOWSSW108 sample, but a value of 170,000 mg/kg was reported for its duplicate. Because of the extremely high level reported in the duplicate, four additional samples were collected at/near this same sampling location in November 2010 to determine whether the anomalous duplicate results were indicative of a "hot spot" or were errant. Sample SSW-108-R was collected from the same coordinates as PBOWSSW108, and SSW-108-NE, SSW-108-NW, and SSW-108-S were all collected 5 feet from the original location. The TNT concentrations in these samples ranged from 0.352 mg/kg (SSW-108-R) to 49.9 mg/kg (SSW-108-NW). It is noted that no sandy fill was present at these four SSW-108 locations in 2010. The nitroaromatic results from the four 2010 samples were averaged, similar to duplicates, to represent this location, because none of these samples—nor the original LSI sample—suggested the presence of a hot spot.

2.3 Evaluation of Data Quality

The quality of the analytical data was evaluated to select data for inclusion in the BHHRA. Data quality is expressed by the assignment of qualifier codes during the analytical laboratory quality control (QC) process or during third-party data evaluation. Some of the more common qualifiers and their meanings are as follows (EPA, 1989a):

U - Chemical was analyzed for but not detected; the associated value is the sample quantitation limit.

J - Value is estimated, usually below the reporting limit.

N - The analysis indicates an analyte for which there is presumptive evidence to make a tentative identification.

NJ - The analysis indicates a "tentatively identified analyte" and the reported value represents its approximate concentration.

UJ - The analyte was not detected above the reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - QC indicates that the data are unusable (chemical may or may not be present).

B - The concentration in the sample is not sufficiently higher than concentration in the blank, using the 5-times, 10-times (5x, 10x) rule, which states that a chemical is considered a nondetect unless its concentration exceeds 5 times the blank concentration. For common laboratory contaminants (acetone, 2-butanone [methyl ethyl ketone], methylene chloride, toluene, and the phthalate esters), the sample concentration must exceed 10 times the blank concentration to be considered a detection.

"J," "N," and "NJ" qualified data are treated in the BHHRA as detected concentrations; "R" data and "B" qualified chemical data are not used. "U" qualified data (nondetects) are treated in the BHHRA as nondetections. The use of data with other, less common qualifiers is evaluated on a case-by-case basis. Generally, data for which the identity of the chemical is unclear are not used in the BHHRA. If confidence that the chemical is present is reasonably high, but the actual concentration is somewhat in question, the data generally are used in the BHHRA.

Some chemicals may be analyzed under two different analytical programs. For example, the DNT isomers are analyzed by EPA Method 8330 for nitroaromatics as well as EPA Method 8270C for semivolatile organic compounds. Risks associated with the reported values from both analyses are considered in the risk characterization (Chapter 5.0) and discussed as appropriate in the uncertainty analysis (Chapter 6.0), together with potential issues such as the relative sensitivities (i.e., differences in respective reporting limits) of the methods.

2.4 Identification of Chemicals of Potential Concern

A screening process is used to identify COPCs, which are the detected chemical analytes carried through the full risk assessment process. The objectives of COPC screening are to focus the risk assessment on those chemicals that may contribute significantly to overall risk and to remove from quantification those chemicals whose contribution is clearly inconsequential. COPC screening includes a risk-based screen which also considers status as a human nutrient (Section 2.4.1), a frequency-of-detection evaluation (Section 2.4.2), and a background screen (Section 2.4.3).

2.4.1 Risk-Based Screening

In the risk-based screen, the maximum detected concentration (MDC) of a chemical in a given medium is compared to the appropriate risk-based screening concentration (RBSC) for that chemical and medium. This is performed for each chemical in each medium. The units of the

MDC and RBSC are the same for each chemical in a given medium. In groundwater, for example, both the MDC and RBSC have units of micrograms per liter (µg/L) in water.

If the MDC of a chemical is less than or equal to its RBSC, then the chemical is not considered further in the BHHRA for this medium because it is very unlikely that chemical concentrations at or below the RBSC would contribute substantially to risk. An analyte may be identified as a COPC if its MDC exceeds its RBSC. As indicated in Section 2.4, actual status as a COPC also depends on a chemical's frequency of detection (Section 2.4.2), concentration with respect to background (Section 2.4.3), and potential status as a nutrient. Groundwater RBSCs used in the BHHRA are derived from the EPA (2010d) regional screening level (RSL) table "tap water" values, and RBSCs for soil are derived from "residential soil" RSL values. This is a change in the source of the RBSCs for PBOW BHHRA work plans begun prior to March 2009 based on discussion between USACE and OEPA (2009c), and this change is consistent with recent OEPA (2009a) guidelines. Previously, the groundwater and soil RBSCs were derived from the corresponding EPA (2004b) Region 9 preliminary remediation goals (PRG). The soil RBSCs are applied to both surface and subsurface soil.

RSL values are based on a concentration equal to either an incremental lifetime cancer risk (ILCR) of 1E-6 or a noncancer hazard quotient (HQ) of 1, the threshold at (or below) which adverse noncancer effects are regarded as unlikely to occur. For the BHHRA, the noncancer values listed in the RSL tables are multiplied by a factor of 0.1 to provide additional protection for simultaneous exposure to multiple chemicals (OEPA, 2009a; EPA, 2010e). This results in RBSC values associated with an HQ of 0.1. For cancer risk, the RSL values based on an ILCR of 1E-6 were used directly as RBSCs in the BHHRA. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) identifies acceptable exposure levels that are generally associated with concentration levels that represent an excess upper bound lifetime cancer risk to an individual of 1E-6 to 1E-4 (EPA, 1990). This range is hereinafter referred to as the "NCP risk management range." Cancer risks associated with RSL values represent the lower end of this range. The OEPA recognizes an overall cancer risk of 1E-5, which represents the logarithmic midpoint of the EPA risk management range, as a remedial goal (OEPA, 2009b). The RBSC for a chemical that elicits both cancer and noncancer health effects is selected based on either a cancer risk of 1E-6 or an HQ of 0.1, whichever associated concentration is lower.

Risks associated with exposure to sediment and surface water in the two drainage ditches north and west of WWTP1 are also evaluated in the BHHRA. Only one surface water sample could be collected. This sample was taken at location WWTP1-SW01, from a pooled area within the ditch north of WWTP1 (Figure 2-1). Both ditches were otherwise dry and, thus, only one surface water

sample was collected. Although RSLs have not been developed specifically for sediment and surface water, RBSCs can be derived from the RSLs based on site conditions at PBOW and the types of exposure to these media that may reasonably be anticipated. The routes by which receptors may be exposed to sediment (i.e., incidental ingestion, dermal contact) are similar to those by which receptors may be exposed to soil. However, sediment contact is expected to be appreciably less intense than soil contact, due to the lower duration and frequency of contact with sediment as compared with soil. Similarly, surface water exposure is expected to be much less intense than exposure to groundwater, as surface water from WWTP1 is not regarded as a plausible source of drinking water, partly because the Erie County Health Department does not permit using surface water as private drinking water and also because the drainage ditches do not contain nearly enough water for drinking water use. Consequently, the exposure frequency is expected to be much lower for surface water, and the incidental ingestion of surface water would be much lower than the assumed intentional ingestion and use of groundwater from the tap. For these reasons, OEPA (1999) stated that unadjusted tap water PRG values (i.e., HQ = 1; ILCR = 1E-6) should be used for screening PBOW surface water. This screening protocol was adopted specifically because it was agreed that the magnitude of exposure associated with PBOW surface water exposure would be far less than that associated with household tap water. In other words, it was agreed that analytes with a maximum concentration at the PRG level would not contribute appreciably to overall risks and hazards for PBOW sites based on the exposure pathways of the surface water exposure scenarios for PBOW. The same agreement was reached for screening sediment against unadjusted residential soil PRGs. This protocol has been updated to base sediment and surface water RBSCs on RSLs rather than PRGs, just as soil and groundwater RBSCs are currently based on RSLs. Even though the sediment and surface water RBSCs are an order of magnitude higher for noncarcinogens than the respective soil and groundwater RBSCs, these sediment and surface water RBSCs are regarded as protective of sediment and surface water receptors for screening because of the lower exposure rate to these media. Note that this previously made PBOW Team agreement for screening surface water and sediment (OEPA, 1999), which considered site-specific conditions, takes precedence over current OEPA (2009b) guidance, which simply states that adjusted RSLs (i.e., RBSCs) for soil may be used to screen contaminants in sediment, and those for groundwater may be used to screen surface water. The surface water RBSCs also meet the outside-of-the-mixing-zone average non-drinking water concentrations for the Lake Erie Basin.

The screening of lead in soil and groundwater is a special case. The EPA (2011a) Office of Water treatment technique action level of 15 µg/L for lead is listed in the RSL table, and the RSL user's guide recommends this level for use as an RSL. Lead exposure and risk is evaluated separately from other chemicals using the EPA (2004c) Integrated Exposure Uptake Biokinetic

(IEUBK) model. The selection of the action level as the drinking water RSL is based partly on IEUBK model. Section 5.2 of the RSL user's guide states that if the average tap water concentration exceeds 15 µg/L and the average soil concentration exceeds a value of 250 mg/kg, then more than the IEUBK target (EPA, 2004c) of 5 percent of the population of exposed children would exceed 10 micrograms per deciliter of lead in blood. Because an RSL of 15 µg/L sufficiently screens for a potential average concentration of 15 µg/L, the RSL of 15 µg/L is used as the RBSC. However, it is possible that the residential soil RSL of 400 mg/kg, which is selected as the soil RBSC, may not screen for an average soil concentration of 250 mg/kg within a given data set. Therefore, the following conditions were placed on the screening of lead: 1) If either the soil RBSC or groundwater RBSC is exceeded, then the IEUBK blood-lead model is run using both average soil and groundwater concentrations, and 2) if the average soil concentration exceeds 250 mg/kg, then the IEUBK model is run, even if neither RBSC is exceeded, using average concentrations of lead in both soil and groundwater. Note that for WWTP1 total soil, the MDC for lead (115 mg/kg) is less than both the RBSC (400 mg/kg) and the criterion for average concentration (250 mg/kg). Likewise, the lead MDC in WWTP1 overburden groundwater (2.8 µg/L) is less than the RBSC (15 µg/L), and lead was not detected in bedrock groundwater. Therefore, the IEUBK model was not run for WWTP1 soil and groundwater.

There are no RSLs for sulfate in tap water, but the drinking water outside-of-the-mixing-zone average value of 250 milligrams per liter (mg/L) for the Lake Erie Basin is used as the RBSC. This value is the same as the secondary drinking water regulation of 250 mg/L (EPA, 2011a). Secondary drinking water regulations are non-promulgated values, based on aesthetic characteristics, which are used as guidelines for public water systems. A health-based advisory level of 500 mg/L also exists for sulfate (EPA, 2011a).

The evaluation of essential nutrients is a special form of risk-based screening applied to certain ubiquitous elements that are generally considered to be required human nutrients. Essential nutrients such as calcium, chloride, iodine, magnesium, phosphorous, potassium, and sodium are generally considered innocuous at levels found in environmental media. There are no RSLs listed for these nutrients. Should any of these chemicals be identified as site related, an exposure analysis is performed whereby a daily dose of chemical from ingestion of the medium in question is calculated. The dose is compared with levels known or expected to be safe or toxic, and/or with recommended daily allowances, depending on the availability of data.

2.4.2 Frequency of Detection

When confidence that a given chemical is present is high, the data generally are used in the BHHRA. For most chemicals, their detection is presumptive evidence of their presence. As suggested by EPA (1989a), chemicals that are reported infrequently may be artifacts in the data that do not reflect the actual presence of the chemical in question. For the BHHRA, chemicals that are reported only at low concentrations in less than 5 percent of the samples from a given medium are excluded from further consideration, unless the presence of a given chemical is expected based on historical information about the site. Chemicals detected infrequently at high concentrations may identify the existence of contaminant plumes or limited "hot spots" and are retained as COPCs.

2.4.3 Comparison to Background

A number of the chemicals detected in PBOW environmental media may have MDCs that exceed RBSCs but are part of normal background concentrations. Such chemicals may include inorganics and polycyclic aromatic hydrocarbons (PAH), a class of organic compounds which form from natural or anthropogenic combustion of organic matter, including fossil fuels, and are generally ubiquitous in the environment. Airborne PAHs associated with non-U.S. Department of Defense sources may be deposited on soil and leach to groundwater. Benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds, as well as PAHs, may also be associated with background concentrations due to the presence of natural petroleum-derived compounds present in the vicinity of PBOW (Section 3.1.1).

Site concentrations of inorganic chemicals in site environmental media may be compared to those of PBOW background using a two-step approach: 1) background screening and 2) statistical data set testing. This second step (Section 2.4.3.2) is initiated only in cases where the concentration used for background screening is exceeded (Section 2.4.3.1) and is performed after the risk characterization (Chapter 5.0). The results of the statistical data testing are discussed in the uncertainty analysis (Chapter 6.0). No suitable background data set exists for overburden groundwater, so no background screening or statistical comparisons to background concentrations can be made for overburden groundwater samples. Similarly, no background screening or statistical evaluation can be performed for surface water or sediment analytical data, as these media lack PBOW background data sets.

Inorganics and organics are treated similarly from a quantitative perspective. However, all organics not eliminated on the basis of RBSC exceedance (Section 2.4.1) or infrequent detection (Section 2.4.2) are carried through the risk calculation process (exposure assessment, toxicity assessment, and risk characterization). As presented in Section 2.4.3.3, organic compounds are

quantitatively eliminated as background related only through the uncertainty analysis if applicable.

2.4.3.1 Background Screening of Inorganics

Background screening is applied to each inorganic whose MDC in soil or limestone bedrock groundwater exceeds the RBSC and that cannot be characterized as an infrequently detected analyte. In background screening, the MDC is compared to the PBOW chemical-specific background screening concentration (BSC). The background data set and derivation of soil BSCs for all PBOW soil investigations are described in IT (1998) (Table 2-2), and the background data set and derivation of BSCs for PBOW bedrock groundwater are described in the 2004 groundwater report (Shaw, 2005) (Table 2-3). It is noted that the method agreed upon for the development of BSCs, as recorded in the September 11, 2002 PBOW team meeting minutes, differs from that shown in current OEPA (2004a) guidance. This PBOW team agreement, which has been used for all PBOW risk assessments to date, takes precedence over the subsequent OEPA (2004a) guidance. Summary tables of the background data sets for soil and groundwater are provided as Tables 2-2 and 2-3, respectively. The background soil samples were collected from near the property boundary, away from any potential source areas, and the background groundwater wells were installed in off-site areas upgradient of PBOW sources. Briefly, BSCs were calculated for use at PBOW based on concentrations found in these background soil and bedrock monitoring well samples. Each BSC is either the MDC or the calculated 95th percent upper tolerance limit of the background data set, whichever value is lower (IT, 1998; Shaw, 2005). The background monitoring well samples were collected using low-flow samples and were unfiltered.

The background screening consists of comparing the MDC of the site data set to the BSC. The chemical may be regarded as a COPC if its MDC exceeds the BSC for that chemical or if no BSC can be determined due to a lack of detections in the background data set. COPCs are fully evaluated in the exposure assessment, toxicity assessment, and risk characterization. An inorganic analyte is not regarded as a COPC if its MDC is equal to or less than the BSC.

2.4.3.2 Statistical Data Set Testing of Inorganics

Statistical testing is performed to compare data sets of site inorganics data against the appropriate PBOW background data sets. As described in Section 2.4.3.1, the background data set for groundwater is presented in the 2004 groundwater report (Shaw, 2005), and the background data set for soil is presented in the site investigation for the acid areas (IT, 1998). As mentioned previously, background data sets do not exist for overburden groundwater, surface water, or sediment; therefore, a statistical background evaluation for COPCs in these media cannot be

performed. The method for statistical comparison of the site data sets to the background data sets, described in Appendix M of Shaw (2005), is the Wilcoxon Rank Sum (WRS) statistical test (also known as the Mann-Whitney U test). WRS testing is performed for inorganics having MDCs that exceed the respective BSCs and are identified as COPCs based on RBSC comparison (Section 2.4.1) and frequency of detection (Section 2.4.2). All COPCs are carried through the risk characterization process; thus, statistical testing results are not used to screen out any chemicals.

Site data sets are interpreted as being significantly different from PBOW background if the associated p-level is less than 0.05. WRS statistical output and box-and-whisker plots of the various inorganic COPC data sets are appended to the BHHRA for each inorganic data set evaluated against the appropriate site background data set; the WRS results are discussed as part of the uncertainties. Analytes shown by the WRS results to exceed background (or for which the WRS testing was not run) are assumed to be site related, unless a qualitative chemical-specific explanation is presented in the uncertainties analysis as to why the analyte should not be regarded as site related. The WRS is not run if the COPC was not detected in the PBOW background data set. Data sets for which the WRS results do not suggest site relatedness (i.e., site data and background data are not statistically different) are still evaluated for risks and hazards in the risk characterization (Chapter 5.0).

2.4.3.3 Treatment of Organic Compounds

As mentioned in Section 2.4.3, certain organic compounds (e.g., BTEX and PAHs) in site media may be attributable to background conditions. However, no organic compounds are summarily screened out. Instead, all detected organic compounds are carried through the risk assessment process (i.e., exposure assessment, toxicity assessment, risk characterization) unless screened out on the basis of comparison to RBSCs (Section 2.4.1) or characterized as infrequently detected (Section 2.4.2). Background contributions of organics are discussed in the uncertainties analysis, as applicable.

2.5 Data Evaluation Summary

Data summary tables are provided for the following WWTP1 media: surface soil (Table 2-4), subsurface soil (Table 2-5), total soil (Table 2-6), bedrock groundwater (Table 2-7), overburden groundwater (wells) (Table 2-8), sediment (Table 2-9), and surface water (Table 2-10). These tables provide the following information for each detected chemical in each environmental medium:

- Chemical name
- Frequency of detection
- Range of detected concentrations
- Range of detection limits
- Arithmetic mean of site concentrations
- 95th percent upper confidence limit on the arithmetic mean (UCL) (for COPCs only)
- Appropriate RBSC
- Appropriate BSC
- Selection/exclusion of chemical as a COPC
- EPC (for COPCs only).

The estimation of the UCL values for COPCs is discussed in Section 3.2.1. For duplicate samples, the associated values are averaged in the data summary, if both samples are detects or if both are nondetects; if only one of the duplicates is a detect, then this detected value is used in the data summary.

An analogous summary table for the overburden groundwater piezometer samples is appended (Appendix A). Note that these direct-push groundwater samples are collected for nature-and-extent purposes to determine groundwater flow direction and the placement of monitoring wells. These data are not sufficiently representative of groundwater conditions for use in risk assessment. Therefore, they are not used to identify COPCs and are not quantitatively evaluated in the BHHRA. This piezometer groundwater summary table is appended only to provide ancillary information.

The COPCs for each of the WWTP1 media are identified as follows:

- ***Surface Soil*** – Vanadium, Aroclor 1254, TNT, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-c,d)pyrene

- ***Subsurface Soil*** – 1,3-Dinitrobenzene, 2,4-DNT, 2,6-DNT, TNT, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-c,d)pyrene

- ***Total Soil*** – Vanadium, Aroclor 1254, TNT, 2,4-DNT, 2,6-DNT, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-c,d)pyrene

- ***Bedrock Groundwater*** – Arsenic, chromium, iron, manganese, 2-methylnaphthalene, naphthalene, benzene, chloroform, chloromethane, ethylbenzene, methylene chloride, 1,1,2,2-tetrachloroethane, toluene, xylenes, nitrate-nitrite

- ***Overburden Groundwater*** – Arsenic, cobalt, manganese, 2,4-DNT, 2,6-DNT, bis(2-ethylhexyl)phthalate

- ***Sediment*** – Chromium
- ***Surface Water*** – (none).

As discussed in Section 2.2, the total soil COPCs include all surface soil and subsurface soil COPCs.

3.0 Exposure Assessment

Exposure is the contact of a receptor with a chemical or physical agent. An exposure assessment estimates the type and magnitude of potential exposure of a receptor to COPCs found at or migrating from a site (EPA, 1989a). An exposure assessment includes the following steps:

- Characterize the physical setting.
- Identify the contaminant sources, release mechanisms, and migration pathways.
- Identify the potentially exposed receptors.
- Identify the potential exposure pathways.
- Estimate exposure concentrations.
- Estimate chemical intakes or contact rates.

The BHHRA characterizes potential exposures to COPCs in WWTP1 environmental media as portrayed by the CSEM in Section 3.1. Note that these environmental media include soil, surface water, sediment, and groundwater.

3.1 Conceptual Site Exposure Model

The CSEM provides the basis for identifying and evaluating the potential risks to human health in the BHHRA. The CSEM, graphically depicted on Figure 3-1, includes the receptors appropriate to all plausible site-use scenarios and the potential exposure pathways. This presentation of all possible pathways by which a potential receptor may be exposed, including all sources, release and transport pathways, and exposure routes, facilitates consistent and comprehensive evaluation of risk to human health and helps to ensure that potential pathways are not overlooked. The elements of a CSEM include the following:

- Source
- Source media (i.e., initially contaminated environmental media)
- Contaminant release mechanisms
- Contaminant transport pathways
- Intermediate or transport media
- Exposure media
- Receptors
- Routes of exposure.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact with a contaminated source medium (e.g., ingestion or dermal contact).

The receptors and pathways on Figure 3-1 reflect scenarios developed from information regarding site background and history, topography, climate, and demographics as presented by

D&M (1997) and the sitewide groundwater investigation (IT, 1997). On Figure 3-1, asterisks identify exposure pathways that are complete and addressed in this BHHRA. Justification for exclusion of other pathways is provided in the Figure 3-1 footnotes, and the exclusion of other potential receptors is discussed in Section 3.1.3.8. No current or future exposure by off-site residents is evaluated. Most of the off-site residents are serviced by municipal water from surface water sources. Although there are numerous private groundwater wells in the vicinity, including eight within 1 mile of the facility boundary, none of these is used as a potable source. Based on the investigations of other PBOW sites, natural hydrocarbons and hydrogen sulfide are known to be present within the bedrock limestone, and shale formation groundwater generally provides low yields and is of low quality (Shaw [2008b]); however, the groundwater underlying WWTP1 is not summarily excluded for consideration as a tap water source based on natural water quality parameters or general assumptions concerning yield. Therefore, given the presence of numerous off-site wells and the assumption of unrestricted future land use on site, the development of groundwater for on-site residential (or on-site worker) use as tap water is initially regarded as plausible for purposes of this BHHRA. Groundwater quality and potential use is discussed further in the risk characterization (Chapter 5.0) and uncertainty analysis (Section 6.2.5).

3.1.1 Physical Setting

The topography of WWTP1 is essentially flat with a slight sloping gradient. There are currently no structures above grade, but foundations have been covered with a sandy fill material. WWTP1 is covered with a variety of vegetation types. In the far eastern portion of the site, some mowing appears to occur, but not more than a few times per year. More frequent mowing occurs immediately along the road. The remainder of WWTP1 contains a combination of upland old field and dense shrub thicket dominated by gray dogwoods up to about 8 feet in height. Scrub/shrub vegetation occurs along the ditch located on the northern border of the WWTP1 study area.

The following subsections further describe the physical setting of WWTP1, including the climate and meteorology of the Sandusky region (Section 3.1.1.1), and geology (Section 3.1.1.2), soil (3.1.1.3), hydrology (Section 3.1.1.4), and surface water characteristics (Section 3.1.1.5) of the area and of WWTP1 in particular. A general description of WWTP1 is provided in Section 1.3.

3.1.1.1 Climate/Meteorology

The climate in the Sandusky area is continental and strongly affected by Lake Erie. July is generally the warmest month (average high and low temperatures of 82 and 65 degrees Fahrenheit [°F], respectively), and January is generally the coldest (average high and low temperatures of 32 and 19°F, respectively) (The Weather Channel, 2004). On average, the first freezing day (low of 32°F or less) occurs in late October (average of three per month), and the

last freezing day falls in early May (average of one per month) (National Oceanic and Atmospheric Administration, 1990). The average annual precipitation for Sandusky is 34.5 inches per year, with a monthly average of more than 3 inches per month falling in April through September and less than 3 inches in each of the other seven months (The Weather Channel, 2004). Precipitation is fairly evenly distributed throughout the year, with the fewest precipitation days (0.01 inch or greater) per month (10) occurring during July, August, September, and October, and the most (15) occurring in December and January (City-Data.com, 2004). The mean annual wind speed is 10.3 miles per hour (City-Data.com, 2004), with winds predominantly from the southwest (Science Applications International Corporation, 1991). Sandusky area winters are cloudy, with 33 percent sunshine during November through February, as compared with up to 65 percent sunshine during the summer months (City-Data.com, 2004).

3.1.1.2 Geology

Three formations, all of Devonian Age, outcrop across PBOW, each of which was encountered in the upper 100 feet of bedrock at PBOW (Shaw, 2005). The Delaware Limestone is the lowermost formation screened by site wells. It is characterized as a hard, dense, finely crystalline limestone and dolomite. The unit is typically buff colored and usually is described as fossiliferous. In the vicinity of PBOW, quarries mine limestone from the Delaware. Traces of natural petroleum-derived hydrocarbons and hydrogen sulfide are common in area quarries (Shaw, 2005). Petroleum hydrocarbons were observed at depth during the drilling of all three WWTP1 wells. WTP1-BEDGW-001 had petroleum hydrocarbon staining at 47.9 to 49.3 feet, 52.4 to 52.6 feet, and 68.8 to 80.6 feet, and hydrocarbon seeping from factures at 68.4 to 68.5 feet and 74.0 to 74.4 feet bgs. Note that WTP1-BEDGW-001 was dry and no samples could be collected from this well. Petroleum hydrocarbon staining was also observed at depth on the cores of WTP1-BEDGW-002 (51.7 to 54.3 feet bgs) and WTP1-BEDGW-003 (49.9 to 54.8 feet bgs), with hydrogen sulfide odor observed in the latter during well purging. Note that hydrogen sulfide has been observed at high concentrations in bedrock wells at nearby PBOW sites, notably in AP1 well AP1-BEDGW-002 and in Locomotive Building Area (LBA) monitoring well MNTA-BEDGW-001 (more than 200 parts per million [ppm]) (Shaw, 2011b). Also, in nearby AP1 well AP1-BEDGW-001 to the south (generally upgradient), approximately 1 to 2 feet of free product has been found on the surface of the water during sampling (Shaw, 2011c). Petroleum hydrocarbons were also found at depth in four of the six bedrock wells in the nearby LBA (Shaw, 2011b) to the west (side gradient), indicating the prevalence of petroleum contamination in the bedrock zone within this general area of PBOW. These observations provide evidence that petroleum hydrocarbons and elevated levels of hydrogen sulfide are naturally occurring in this general area of PBOW.

3.1.1.3 Soils

The overburden in Erie County is predominantly glacial till, glacial outwash, or glacial lacustrine (lake) deposits. In the vicinity of PBOW, the soil has been interpreted to be lacustrine. In many areas, the overburden also consists of highly weathered bedrock. The thickness of the overburden ranges from less than 1 foot to more than 25 feet. Overburden is thickest on the northern portion of the PBOW facility in the vicinity of the Reactor Facility Area, where it has filled in a bedrock low (Shaw, 2005). In the WWTP1 area, the overburden thickness ranges from 21 to 24 feet, based on boring logs.

At many PBOW sites, following closure and removal of the manufacturing structures, tanks, and equipment, a local fill sand was brought to the areas to cover the remaining concrete building foundations and demolition scars and to provide a natural landscape appearance. Based on drilling and sampling results, some fill is present at WWTP1, with an interpreted thickness of up to 2.6 feet. However, a portion of the eastern edge of the thick liquor storage tank pad or possibly the evaporation building foundation is still visible. The fill material and the interpreted 1940 ground surface are very similar in lithology (very fine-grain sand), but the native ground surface soil is interpreted to be characterized by color laminations and striations compared to a homogenous and sometimes mottled fill sand. At some of the borings, a thin gravel layer was encountered and interpreted to be a former working or driveway surface. Interpreted borelog information from piezometer and monitoring well installation showed the maximum thickness of the fill material is potentially 2.6 feet. The average depth of fill sand encountered at WWTP1 is 1.3 feet, and fill material is absent in some portions of the site (e.g., the four SSW-108 locations).

Native soil at WWTP1 was predominantly derived from glacial deposits (till, outwash, or glacial lacustrine [lake] deposits). Specifically at WWTP1, the top 6 feet of soil generally consists of a very fine-grain, homogenous, stratified sand with vertical laminations. Below 6 feet, the soil changes to a stiff, homogenous, dark gray, highly plastic, silty clay. Rock fragments consisting of shale and limestone were commonly encountered near the bottom of borings that were advanced to bedrock.

3.1.1.4 Hydrology

The two main water-bearing zones at PBOW are located in the overburden/shale unit and the limestone bedrock and are thus called the overburden/shale and bedrock water-bearing zones. The overburden and shale groundwater units show similar water levels in these two units, suggesting substantial vertical communication. Therefore, these two geologic units are combined for purposes of PBOW groundwater evaluation. Data collected during the more recent investigations (Shaw, 2005; IT, 1997, 1999, 2001b) indicate that groundwater in the overburden

is in discontinuous pockets during dry time periods. The shallow overburden generally has low yields over most of PBOW due to the high percentage of silt and clay. In contrast, the limestone bedrock water-bearing zone yields groundwater year round, although specific locations may not yield water because of limited bedrock fractures in some areas. During periods of low precipitation, only limited migration of contaminants would occur in the overburden due to less infiltration.

Regional groundwater flow in both the overburden/shale and the limestone bedrock is to the north-northeast towards Lake Erie, although local flow may vary due to local topography. The general flow direction in the overburden water-bearing zone is to the north in the immediate vicinity of WWTP1. A hydrogeological study by the U.S. Geological Survey (1992) conducted in the glacial deposits of Sandusky in 1990 reported a horizontal hydraulic conductivity of 0.046 feet per day and a vertical hydraulic conductivity of 1.2 feet per day.

Water in the limestone bedrock typically occurs in joints and along bedding planes or in solutionally enlarged openings. The conceptual model interprets that bedrock groundwater flow in the Delaware Limestone water-bearing zone is influenced by the frequency, orientation, density, and connectivity of the bedrock fractures. These fractures result in localized groundwater flow direction to the northwest in the vicinity of WWTP1.

Based on locations and yields of domestic groundwater wells outside PBOW boundaries, the Ohio Department of Natural Resources divided the bedrock groundwater in the vicinity of PBOW into three zones (D&M, 1997). Zone 1 occurs in the north and northwestern portion of PBOW. It has been characterized as yielding from 100 to 500 gallons per minute (gpm) from karstic limestone approximately 100 feet below grade. Zone 2 is in the northern portion of PBOW and has yields of 15 gpm or less from limestone approximately 300 feet below grade. Zone 3 is located in the eastern and southern portion of the site in predominantly shale bedrock. In addition to being found in the shale, groundwater is located in thin sand and gravel horizons interbedded with silt and clay deposits. Most Zone 3 wells are poor yielding, many of them providing less than 3 gpm (D&M, 1997). WWTP1 is within Zone 1, despite the poor water yield.

Overburden groundwater at WWTP1 was encountered at depths ranging from 2.4 feet bgs (PZ-02) to 5.5 feet bgs (SB-08/PZ-05 and PZ-01) in December 2008 (wet season) during soil boring drilling/piezometer installation. During monitoring well installation conducted in March 2009 (wet season), overburden/shale groundwater was encountered at depths of 1 foot bgs (WTP1-MW01 and WTP1-BEDGW-001) to 3 feet bgs (WTP1-BEDGW-003). Groundwater flow within the overburden is toward the north-northwest.

Two bedrock wells were installed at WWTP1 during the RI. Bedrock groundwater was encountered in fractures at depths of 45 feet bgs (WTP1-BEDGW-002) and 47.2 feet bgs (WTP1-BEDGW-003) during bedrock monitoring well installation in March 2009. No water-bearing fractures were encountered during bedrock drilling for WTP1-BEDGW-001, so the borehole was properly abandoned and no well was installed at this location. Bedrock groundwater flow underlying WWTP1 is in a northwest direction toward a bedrock groundwater trough (Shaw, 2011a).

3.1.1.5 Surface Water

Two drainage ditches are associated with WWTP1, one to the north and the other to the west. These typically do not contain flowing water, and during the RI sampling event, both were virtually dry, although one surface water sample (WTP1-SD01) was collected from a pooled area within the northern ditch. No other surface water is found on WWTP1. These two ditches converge northwest of WWTP1 and drain during precipitation events to the north-northwest into an unnamed tributary to Plum Brook. During the RI sampling event, this pooled area sampled in the northern ditch was several square feet in area and contained a maximum depth of approximately 4 inches of water.

The drainage ditch was dry during all groundwater level measurement events and virtually dry during the surface water sampling event. However, during the May 2009 wet period water elevation measurement event, the water level in PZ-01 was approximately 0.5 foot higher than the bottom of the ditch, even though the ditch was dry. The proximity of the water table to the elevation at the bottom of the ditch in May 2009 suggests that, during particularly wet periods, some groundwater discharge may occur to the ditch. However, the observation that the ditch was dry or virtually dry during all sampling/measurement events indicates that groundwater does not typically discharge to the ditch.

3.1.2 Contaminant Sources, Release Mechanisms, and Migration Pathways

Contaminant sources, release mechanisms, and migration pathways are summarized on Figure 3-1. Briefly, TNT is made by nitrating toluene in a three-step process that uses nitric and sulfuric acids (D&M, 1997). WWTP1 received a waste water slurry via sewer lines from the TNTA and TNTB manufacturing operations waste water settling basins. This slurry was either treated and evaporated (thickened to reduce mass) or the liquid from the slurry was discharged to open waste water ponds. If treated, the thickened liquid was incinerated, and the ash from this incineration was disposed of in AP1. Contamination resulted from the inadvertent release of TNT, its precursors, contaminants and residues, and acids or sellite (sodium sulfite made from soda ash

and sulfur) from the process lines or drying areas. Releases occurred to the surface soil and to subsurface soil from vertical migration. Runoff and erosion may have spread contamination over the surrounding surface soil and carried contaminants to nearby streams. Infiltration and leaching carried contaminants into the subsurface soil or groundwater. It is possible that surface water and sediment at the drainage ditches may have been impacted by contaminants originating from WWTP1 through surface drainage.

3.1.3 Receptors and Exposure Pathways

Receptors selected to represent the upper bound on exposure from all plausibly exposed groups of people associated with WWTP1 as well as the pathways by which they may be exposed to chemicals are summarized on Figure 3-1 and in Table 3-1. The exposure variable values used in the contaminant intake models are compiled in Table 3-2. The receptors evaluated in the BHHRA are listed below.

- Current groundskeeper
- Future groundskeeper
- Indoor worker (future)
- Construction worker (current/future)
- On-site resident (future)
- Hunter (future)
- Hunter's child (future).

Note that the current (Section 3.1.3.1) and future (Section 3.1.3.2) groundskeeper scenarios include different environmental media and are, thus, listed separately. The construction worker may be viable under current or future land use, but the evaluation for this receptor is exactly the same under current and future land use.

Most BHHRAs are based on a reasonable maximum exposure (RME) assumption. The intent of the RME assumption is to estimate the highest exposure level that could reasonably be expected to occur, but not necessarily the worst possible case (EPA, 1989a; 1991a). It is interpreted as reflecting the upper 90 to 95th percentile on exposure. In keeping with EPA (1989a; 1991a) guidance, variables chosen for a baseline RME scenario for ingestion rate, exposure frequency, and exposure duration are generally upper bounds. Other variables, such as body weight and exposed skin surface area, are generally central or average values. In the case of contact rates consisting of multiple components (e.g., dermal contact with soil or water, which consists of a dermal absorption factor [ABS] and soil-to-skin adherence factor [AF] for soil, and permeability coefficient [K_p] and exposure time [ET] for water), only one variable, ABS or K_p, needs to be an upper bound. The conservativeness built into the individual variables ensures that the entire estimate for contact rate is sufficiently conservative.

The averaging time for noncancer evaluation is computed as the product of the exposure duration (years) multiplied by 365 days per year. The resultant noncancer averaging time is used to estimate an average daily dose over the entire exposure period (EPA, 1989a). For cancer evaluation, the averaging time is computed as the product of 70 years, the assumed human lifetime, times 365 days/year. This cancer-based averaging time is used to estimate an average daily dose prorated over a lifetime, regardless of the frequency or duration of exposure. The methodology used in deriving the averaging time for cancer risks assumes that the risk from short-term exposure to a high dose of a given carcinogen is equivalent to long-term exposure to a correspondingly lower dose, provided that the total lifetime doses are equivalent. This approach is generally consistent with the EPA (2005) policy of carcinogen evaluation, although it introduces considerable uncertainty into the BHHRA cancer risk estimates.

A fractional term (FI) is introduced into the chemical intake equations to account for scenarios in which exposure to a potentially contaminated medium associated with the site is less than total daily exposure to that medium. For example, if the site of interest is small or has unusual dimensions so that a groundskeeper would be unlikely to spend all (or nearly all) of his working time at the site, an FI value of less than 1 might be applied to the soil ingestion and dermal intake equations. An FI may also be split between two comparable media. For example, if a resident is exposed to both soil and sediment, FI values are introduced that apportion exposure between the two media such that the FI value for the two analogous media does not exceed a value of 1 (Section 3.1.3.5).

Receptors and the associated exposure pathways are presented in the following subsections. Please note that some of the pathways considered for the receptors (e.g., surface water exposure; volatile organic compounds [VOC] in soil) could not be quantitatively evaluated because pertinent chemicals associated with these pathways were not identified as COPCs.

3.1.3.1 Current Groundskeeper

The groundskeeper scenario is designed to evaluate the upper bound for long-term site worker exposure to surface soil in the current site-use scenario and total soil in the future site-use scenario. It is noted that other than infrequent mowing (see Section 1.3), no groundskeeper is currently working at the site, but current land use does not prohibit a site worker from performing regular groundskeeping activities at the site.

Exposure to surface soil is evaluated for a (potential) current groundskeeper. Total soil is typically evaluated under the future groundskeeper use scenario because hypothetical future

construction may include considerable excavation of subsurface soil. This soil may be spread on the surface and regraded such that some of the soil currently in the subsurface (i.e., 1 to 10 feet bgs) will be spread as surface soil (0 to 1 foot bgs). Groundwater use is also evaluated for the groundskeeper in the future site-use scenario, as discussed in Section 3.1, which could theoretically be developed as a source of drinking water. It is assumed that any contact with surface water or sediment associated with WWTP1 by this receptor would be infrequent and sporadic, because such contact would not be a part of the groundskeeper's regular duties or activities. Therefore, exposure to these media is not quantified.

Direct soil exposure pathways include incidental ingestion and dermal contact. Inhalation of dust raised by lawnmowers or other equipment is also evaluated because relatively high dust concentrations may be produced within the groundskeeper's breathing zone, with little opportunity for dilution by the large volume of ambient air.

Shaw's experience has been that surface soil that is contaminated with VOCs and that has been in place for extended periods is not a significant source of airborne VOCs, because infiltration and dissipation over time reduces residues at the surface (i.e., first few centimeters) from which volatilization would occur. However, as noted previously, the data set for surface soil may include samples taken from up to 1 foot bgs, which would include the soil zone deeper than the top few centimeters, where dissipation has not reduced VOC concentrations. In other words, the surface soil data set might indicate the presence of VOCs, although volatilization to the air is unlikely to be significant. Therefore, a surface soil-to-air volatilization model is not used in addition to the activity-based dust emissions model to estimate airborne concentrations of VOCs. Instead, the airborne concentrations estimated by the dust emissions model are assumed to sufficiently estimate levels of VOCs that may arise from volatilization, because the dust emissions model treats the VOCs as if they were located at the surface. It is assumed that VOC emissions from subsurface soil (i.e., at depths greater than 1 foot bgs) would be attenuated by the overlying soil so that concentrations in ambient air would not be toxicologically significant.

The groundskeeper is assumed to be a 70-kilogram (kg) adult who works 8 hours per day, approximately 5 days per week year-round on site for a total of 250 days/year for 25 years (EPA, 2004a). The respiratory rate for the groundskeeper is assumed to be 20 cubic meters (m^3) per 8-hour workday or 2.5 cubic meters per hour (m^3/hr) (EPA, 1991a), and the soil incidental ingestion rate is assumed to be 100 milligrams per day (mg/day) (EPA, 2002). The groundskeeper is assumed to be exposed dermally to soil. An exposed skin surface area of 3,300 square centimeters (cm^2) and a soil AF of 0.2 milligrams per square centimeter (mg/cm^2) are assumed (EPA, 2004a).

3.1.3.2 Future Groundskeeper

A future groundskeeper would be exposed to soil via the same exposure pathways as the current groundskeeper described in Section 3.1.3.1. However, the future groundskeeper scenario assumes that construction has taken place and that some of the soil currently in the subsurface has been brought to the surface during earthmoving activities. Therefore, the future groundskeeper is assumed to be exposed to a combination of surface and subsurface soil (total soil) rather than surface soil alone.

In addition, a hypothetical future groundskeeper is assumed to be exposed to groundwater, which could theoretically be developed as a source of drinking water in the future. His drinking water ingestion rate is assumed to be 1 liter per day (L/day) (EPA, 1991a). He may also experience dermal contact with groundwater used to clean equipment and to rinse dust or perspiration from his body. For this evaluation, it is assumed that the head, forearms, and hands, approximately 3,300 cm^2 of his body (EPA, 2004a), would be exposed intermittently for up to 1 hour/day. Because exposure is assumed to be intermittent rather than continuous, organic chemical uptake across the dermis would not reach steady state, which guides the selection of the EPA (2004a) model used to quantify this pathway (Section 3.3).

3.1.3.3 Indoor Worker

This receptor scenario was used to evaluate exposure to indoor airborne VOCs entrapped in a building. VOCs released from subsurface soil may enter a building through joints or cracks in the foundation or slab. The indoor worker is also potentially exposed to surface soil via incidental ingestion. Exposure to COPCs in surface soil via dermal contact and inhalation of airborne dust and VOCs from surface soil, although plausible, are expected to be less significant than incidental ingestion, because this receptor spends his work time indoors. Therefore, dermal contact and inhalation of dust and airborne VOCs from surface soil are not quantified separately from ingestion exposure (EPA, 2002). Under a future use scenario for this receptor, construction of a building would be necessary. This would require excavation and regrading of soil. Normally, when construction is involved (e.g., such as for the future groundskeeper or resident), total soil rather than surface soil would be evaluated for ingestion exposure. However, the chief purpose for this receptor is to evaluate exposure via vapor intrusion of contaminants from subsurface soil into indoor air. Thus, the evaluation of direct contact with subsurface soil as a component of total soil would equate to “double counting” of COPCs in subsurface soil. Also, the groundskeeper reflects a worst-case exposure for a long-term worker with respect to direct contact with both surface soil and total soil. Therefore, direct contact with surface soil for the

indoor worker is included to reflect a more complete exposure scenario, but direct contact with subsurface soil is most effectively addressed from an RME perspective by the groundskeeper.

The indoor worker is assumed to be a 70-kg adult who works 8 hours/day, approximately 5 days/week year-round on the site for a total of 250 days/year for 25 years (EPA, 2002). His incidental soil ingestion rate is assumed to be 50 mg/day (EPA, 2002), and his inhalation rate is assumed to be 20 m^3/8-hour workday (EPA, 1991a).

A future indoor worker is assumed to be exposed to groundwater, which could theoretically be developed as a source of drinking water (Section 3.1). His drinking water ingestion rate is assumed to be 1 L/day (EPA, 1991a). Some indoor worker positions may require relatively frequent dermal contact with groundwater as well, e.g., a food preparer/cafeteria worker who would wash his hands, produce, equipment, etc. For this evaluation, it is assumed that the head, forearms, and hands, approximately 3,300 cm^2 of his body (EPA, 2004a), would be exposed intermittently for up to 1 hour per day. Because exposure is assumed to be intermittent rather than continuous, organic chemical uptake across the dermis would not reach steady state, which guides the selection of the EPA (2004a) model used to quantify this pathway (Section 3.3.4).

3.1.3.4 Construction Worker

The construction worker scenario is used to evaluate short-term exposure to surface and subsurface soil (total soil) in either the current or future land-use scenario. Construction projects are expected to be infrequent. It is assumed that the construction worker participates in only one construction project on the site. Note that no construction projects are anticipated for WWTP1, but WWTP1 is currently under NASA control and a construction project may be possible under current land use. Relevant exposure pathways include incidental ingestion and dermal contact, inhalation of dust raised by operating construction equipment, and inhalation of airborne VOCs released from subsurface soil during excavation and grading. Exposure to groundwater by the construction worker is also possible; however, if on-site groundwater were developed as a tap water source, other potential future groundwater receptors such as the groundskeeper would have longer and/or more frequent groundwater exposure. Therefore, groundwater exposure is not evaluated for the construction worker.

The construction worker may also be exposed to surface water and sediment associated with WWTP1 during projects such as installation of underground utilities or rerouting of surface flow. Sediment and especially surface water are relatively scarce at WWTP1, and exposure associated with these media for the WWTP1 construction worker would be correspondingly minimal to negligible. However, for the sake of consistency and in accordance with the work plan (Shaw,

2009), the construction worker exposure to surface water and sediment is being evaluated with the same protocol used for other PBOW sites, with the understanding that WWTP1-specific issues may lead to the risk characterization results being revisited if appropriate in the uncertainty analysis. Dermal contact is the most significant pathway for exposure to surface water. Incidental ingestion of surface water is also possible but is not expected to be nearly as significant as dermal contact. Inhalation of VOCs from surface water is also possible, but the large volume of outdoor air and natural air currents are expected to dilute airborne concentrations so that this pathway is expected to be less significant than dermal contact, which is quantified. For these reasons, incidental ingestion and inhalation of VOCs from surface water are not quantified separately from dermal contact. Dermal contact and incidental ingestion may be important pathways for exposure to sediment, and both are evaluated.

The construction worker is assumed to be a 70-kg adult who works 8 hours/day, approximately 5 days/week. This represents an annual exposure frequency rate of about 250 days per year, which is the same as described for the groundskeeper (Section 3.1.3.1) and indoor worker (Section 3.1.3.3). Construction projects involving soil exposure are assumed to last 6 months. The respiratory rate for the construction worker is assumed to be 20 m^3/8-hour workday (2.5 m^3/hr) (EPA, 1991a). A soil ingestion rate of 330 mg/day is assumed for the construction worker (EPA, 2002). A dermal soil AF for the construction worker of 0.3 mg/cm^2 and an exposed body surface area of 3,300 cm^2 are assumed, which represent the head, hands, and forearms (EPA, 2002; 2004a).

The construction worker may be exposed to surface water and sediment during the 6-month construction period. The construction worker dermal exposure parameters for sediment are assumed to be exactly the same as those for soil. Dermal exposure to surface water is assumed to occur for up to 4 hours per day, or one-half the normal work day. It is assumed the exposure to surface water is intermittent during this period. An exposed body surface area of 3,300 cm^2, the same as for sediment and soil, is assumed for exposure of the construction worker to surface water. It is expected that the construction worker would wear appropriate footgear and leg protection to minimize surface water and sediment exposure to the legs.

As mentioned above, the exposure assumptions used in the evaluation of surface water and sediment exposure and included in the work plan (Shaw, 2009) are selected to be consistent with other PBOW sites. Therefore, these assumptions (e.g., body surface area available for exposure) are particularly conservative for WWTP1, where the presence of sediment and especially surface water, and the corresponding exposure, are minimal. As stated previously, this exposure assessment protocol was used for WWTP1 surface water and sediment evaluation with the

understanding that the risk characterization results that are based on the exposure assumptions can be revisited in the uncertainty analysis.

The construction worker scenario described above provides for several different kinds of construction projects, such as upland excavation and building projects (exposure primarily to soil), as well as stream rerouting (exposure primarily to surface water and sediment). It is unlikely, however, that a single construction worker would participate in all these activities during a given project. Therefore, the evaluation described above is probably overly conservative and may represent some double counting. For example, it is unlikely that the construction worker would be simultaneously ingesting soil, sediment, and surface water. Similarly, the air in his breathing zone is not likely to contain the reasonable maximum concentrations of COPCs estimated for soil while he is exposed to surface water. The potential for double counting is not expected to contribute significantly to total risk estimates summed across chemicals, pathways, and media. Should construction worker risk estimates exceed acceptable limits, risk and hazard estimates may be performed using refined exposure assumptions based on the physical characteristics of the site. For example, an upland excavation and building project may be assumed for one or more areas of the site, and a stream rerouting project may be assumed for another. Effectively, the risks and hazards associated with surface water/sediment exposure and soil exposure could be separated. This approach would more precisely reflect plausible exposure scenarios, reduce the likelihood of double counting, and more accurately identify risk-driving media and chemicals. These refined estimates would be presented in the uncertainty analysis.

3.1.3.5 On-Site Resident

The on-site residential scenario is used to evaluate the upper bound for long-term exposure to site soil, surface water, sediment, and groundwater under the future land-use scenario. Residential land use is plausible because property surrounding the PBOW facility includes rural residential use. This type of land use is also consistent with assumed future land use of other PBOW sites such as TNTA and TNTC (IT, 2001a).

The on-site residential scenario is evaluated assuming a 30-year residential exposure scenario, considering exposure to a resident as a young child (6-year duration, ages 1 through 6 years) through the adult portion of life spent at this residence (24-year duration) (EPA, 1991a). Noncancer hazard estimates are derived separately for the child and adult life stages. Cancer risk is estimated as the sum of the risks calculated for the adult (24 years) and the child (6 years) (EPA, 2002; 2010e).

The resident is assumed to be exposed directly to total soil, because residential development would involve excavation and regrading, which would mix surface and subsurface soil. Relevant pathways for total soil exposure include incidental ingestion, dermal contact, and inhalation of dust and VOCs. Evaluation of VOCs from total soil is addressed during evaluation of airborne dust, as described for the groundskeeper. For evaluating inhalation of airborne dust, it is assumed that 80 percent of the soil surface is covered with pavement or vegetation. Inhalation of VOCs released from subsurface soil entrapped in indoor air is also evaluated. The resident is also assumed to be exposed to VOCs that have been released from subsurface soil through cracks in the building foundation to indoor air. It is noted that because some of the subsurface soil is expected to be brought to the surface in the future, using only subsurface soil data will conservatively result in some double counting of exposure to any VOC COPCs that may be present in the subsurface soil. This can be addressed in the uncertainty analysis in cases where the subsurface soil-to-indoor air pathway significantly affects risk and hazard estimates. This pathway did not contribute significantly to risk at WWTP1, as no VOCs were identified as COPCs in subsurface soil.

It is assumed that, under future residential land use, the overburden and limestone bedrock water units will be developed as sources of potable water (Section 3.1). The resident is assumed to use groundwater underlying the site as the sole source of household tap water. Exposure to COPCs in groundwater would occur via ingestion, dermal contact during bathing/washing, and inhalation of VOCs released to the air during household use of tap water associated with multiple household uses.

The resident could have access to the WWTP1 drainage ditches and be exposed to associated contaminants in surface water and sediment. Sediment and especially surface water are relatively scarce at WWTP1, and exposure associated with these media for the WWTP1 resident would be correspondingly minimal to negligible. However, for the sake of consistency and in accordance with the work plan (Shaw, 2009), the resident exposure to surface water and sediment is being evaluated with the same protocol used for other PBOW sites, with the understanding that WWTP1-specific issues may lead to the risk characterization results being revisited if appropriate in the uncertainty analysis. Plausible exposure pathways include dermal contact with surface water and incidental ingestion and dermal contact with sediment. Incidental ingestion of surface water in a wading scenario is considered less significant than dermal contact and is not quantified separately from dermal contact. Inhalation of VOC emissions from surface water is also possible, but the large volume of outdoor air and natural air currents are expected to dilute airborne concentrations, so that this pathway is expected to be less significant than dermal

contact, which is quantified. For these reasons, the inhalation of VOC emissions from surface water is not quantified separately from dermal contact.

The adult resident is assumed to be a 70-kg person with an incidental soil ingestion rate of 100 mg/day and an inhalation rate of 20 cubic meters per day (m^3/day) or 0.83 m^3/hr (EPA, 1991a). A body surface area of 5,700 cm^2, representing the hands, forearms, head, and lower legs, is assumed to be available for dermal exposure to soil (EPA, 2004a). A soil AF of 0.07 mg/cm^2 is used as the default RME value for the adult resident (EPA, 2004a). The adult resident is assumed to be exposed for 350 days/year for 24 years (EPA, 1991a; 2002).

The child resident is assumed to be a 1- through 6-year-old child with an average body weight of 15 kg, a soil ingestion rate of 200 mg/day, and an average inhalation rate of 10 m^3/day or 0.417 m^3/hr (EPA, 2004d). An average body surface area of 2,800 cm^2 throughout the 6-year childhood exposure period, representing the head, hands, forearms, lower legs, and feet, is assumed for dermal contact with soil (EPA, 2004a). A soil AF of 0.2 mg/cm^2 is used as the default RME value for the child resident (EPA, 2004a). The child resident is assumed to be exposed for 350 days/year for 6 years (EPA, 1991a; 2002).

It is assumed that the resident would visit the WWTP1 drainage ditch for 8 hours/day, 2 days/week during the warmer half of the year. This resident is assumed to wade for 3 hours/day on 52 days of the year. Mechanisms of exposure to soil and sediment are likely to be similar. Therefore, the incidental soil ingestion rate of 100 mg/day, the surface area of 5,700 cm^2, and the AF of 0.07 mg/cm^2 are also applied to sediment exposure in the adult. Similarly, the resident child soil ingestion rate of 200 mg/day, skin surface area of 2,800 cm^2, and soil AF of 0.2 mg/cm^2 are applied to sediment exposure for this receptor. The WWTP1 drainage ditches generally contain only a few inches of water, and this water is pooled only in isolated areas. It is assumed that an adult body surface area of 7,000 cm^2 is available for exposure to surface water. This represents the same body parts to which soil and sediment would be exposed (i.e., hands, forearms, head, and lower legs) plus the feet (EPA, 1997a; 2004a). The body surface area of 2,800 cm^2, representing the hands, forearms, head, lower legs, and feet, used for soil and sediment exposure in the young child are also used for surface water exposure for this receptor.

As mentioned previously, the exposure assumptions used in the evaluation of surface water and sediment exposure and included in the work plan are selected to be consistent with other PBOW sites. Therefore, these assumptions (e.g., body surface area available for exposure) are particularly conservative for WWTP1, where the presence of sediment and especially surface water are minimal. As stated previously, this exposure assessment protocol was used for

WWTP1 surface water and sediment evaluation with the understanding that the risk characterization results that are based on the exposure assumptions can be revisited in the uncertainty analysis.

EPA (1989a) permits the development of an FI to reflect the proportion of total daily exposure that a receptor obtains from potentially contaminated medium (Section 3.1.3). For this receptor, the FI is used to apportion the resident's time of exposure between site soil and sediment. It is assumed that the resident spends 16 hours/day awake and potentially exposed to soil or sediment. As previously noted, 350 days/year are available for contact with soil; 52 of those days are also available for contact with sediment. It is assumed that contact with soil and sediment does not occur simultaneously; i.e., on those days when the resident spends time at the ditches, 8 hours would be spent in contact with soil and 8 hours would be spent in contact with sediment. Therefore, the fraction of exposure to soil is 16 hours/16 hours = 1 on the 298 days without time spent at the ditches, and the fraction of exposure to soil is estimated as 8 hours/16 hours = 0.5 on the 52 days with some time spent at the streams. A weighted fraction of 0.93 (rounded to 0.9) is estimated for exposure to soil over the entire 350 days/year exposure frequency. A weighted fraction of 0.07 (rounded to 0.1) is estimated for exposure to sediment over the entire 350 days/year exposure frequency.

An adolescent resident may be the most likely individual to have regular exposure to sediment and surface water associated with WWTP1. It is not expected that adults would regularly visit the WWTP1 drainage ditches, as these areas do not support game fish and would seemingly not provide any attraction. It is unlikely that a young child (i.e., ages 1 through 6) would frequent these areas for substantial portions of time, because such young children (especially at the lower end of this age range) would require continued adult supervision. However, as described previously, it is conservatively assumed that the resident will be regularly exposed to surface water and sediment for 30 years: 6 years assumed as a young child and 24 years assumed as an adult. For cancer effects, the 30-year exposure to surface water and sediment represented by both the young child and adult are combined. This approach is more conservative than evaluating an adolescent and is also consistent with BHHRAs performed for PBOW sites in the past.

With respect to groundwater exposure, it is assumed that an adult resident ingests 2 L/day of tap water (EPA, 1991a) and that the young child drinks 1 L/day (EPA, 2010e). The total body surface areas of the adult and of the young child resident are assumed to be exposed to tap water while bathing/showering. The total surface area for an adult is assumed to be 20,000 cm^2 and the total surface area for the young child is assumed to be 6,600 cm^2 (EPA, 1997a). Both the child and adult resident are assumed to be dermally exposed to COPCs in groundwater while

bathing/showering. The child is assumed to bathe for 20 minutes per day (0.33 hour/day) (EPA, 1997a), and the adult is assumed to shower for 12 minutes per day (0.2 hour/day) (EPA, 1997a). Inhalation rates of 0.833 m^3/hr for the adult (EPA, 1991a) and 0.416 m^3/hr for the child (EPA, 2004d) are used. Because EPA (1997a) lists a 90th percentile for time spent in a residence as over 23 hours per day, it is conservatively assumed that the resident spends 24 hours per day in the house.

3.1.3.6 Hunter

This scenario is created to evaluate the potential for contaminants in soil to affect food chain pathways. WWTP1 provides habitat for deer and other wildlife. Even though hunting is not currently permitted at WWTP1, deer hunting is permitted in other areas within PBOW; therefore, future use of WWTP1 for hunting is evaluated in this BHHRA.

Many kinds of game animals may be hunted and consumed (e.g., squirrel, pheasant and other upland birds, turkey, deer); however, the deer is the species most likely to contribute meaningfully to the diet. Therefore, this evaluation is limited to a deer hunter. Potential exposure pathways include incidental surface soil ingestion, dermal contact with surface soil, and ingestion of venison from deer that browse plants growing on contaminated surface soil, all of which are evaluated quantitatively. Inhalation of airborne dust from wind currents is a potentially complete exposure pathway; however, vegetation reduces dust emissions to insignificant levels (EPA, 1996), and it is assumed that the deer hunter would spend virtually all of his time on vegetated rather than bare soil. Therefore, it is assumed that inhalation exposure would contribute much less than incidental ingestion, and the inhalation exposure pathway is not quantified separately from ingestion.

Inhalation exposure to airborne VOCs from subsurface soil and surface water is not evaluated for the reasons previously explained for other receptors. Also, ingestion and dermal exposure to surface water and sediment are expected to be negligible for this receptor, as contact with these media would generally be avoided during hunting activities.

The deer hunter is assumed to be a 70-kg adult who harvests deer and consumes venison over a 30-year period. It is assumed that he spends 14 days per year hunting on PBOW. His incidental soil ingestion rate is assumed to be 100 mg/day (EPA, 1991a). Hunting at PBOW occurs in the fall and winter. Given the temperate climate of northern Ohio during hunting season, a hunter would dress appropriately, with typically only the hands and head exposed, at most. The default industrial RME exposed skin surface area of 3,300 cm^2, which represents the hands, forearms,

and head (EPA, 2004a), is conservatively assumed for the hunter. The default industrial RME soil AF of 0.2 mg/cm^2 (EPA, 2004a) is also assumed.

Data regarding the rate of venison ingestion were not located; therefore, a hypothetical scenario is adapted from the assumptions applied to a similar site in West Virginia (IT, 2000) and subsequently applied to TNTA and TNTC (IT, 2001a). A highly conservative but plausible scenario consists of a hunter who kills one deer from the WWTP1 property each year. It is assumed that the hunter eats 10 pounds (4.5 kg) of venison per year (Sharp, 1995). This consumption rate corresponds to 0.013 kilograms per day (kg/day) (0.186 grams per kilogram of body weight per day [g/kg-day]) of venison for each of the 350 days per year (EPA, 1991a) that the hunter spends at his residence.

3.1.3.7 Hunter's Child

It is likely that a successful hunter, described in Section 3.1.3.6, would share his venison with the rest of the family, which may include small children. Small children, however, would be unlikely to accompany the hunter afield. Therefore, the direct exposure pathways evaluated for the hunter (i.e., incidental ingestion and dermal contact with soil) are not evaluated for the small child.

Data regarding the rate of venison ingestion by small children were not located. However, if it is assumed that venison may replace beef in the diet, the differences in beef consumption between adults and children can be used to estimate a venison ingestion rate for children. EPA (1997a) provides per capita beef intake data for <1- to 5-year-old children ranging from 0.941 to 1.46 g/kg-day (time-weighted average of 1.296 g/kg-day). EPA (1997a) provides per capita beef intake data for 12- to 70-plus-year-old adults ranging from 0.568 to 0.83 g/kg-day (time-weighted average of 0.727 g/kg-day). From these data, it can be estimated that the rate of beef consumption for small children, expressed on a body weight basis, is approximately 1.8 times that of an adult. Therefore, a venison ingestion rate of 0.335 g/kg-day is estimated for a young child from the venison ingestion rate of 0.186 g/kg-day for the adult. Assuming that the child is 1 through 6 years old with an average body weight of 15 kg (EPA, 1991a; 2002), the child's venison ingestion rate may be expressed as 0.005 kg/day.

3.1.3.8 Other Receptors Not Considered

Another plausible receptor group is delivery personnel. These receptors, however, would be less intensively exposed to soil than the groundskeeper; therefore, their exposures are not evaluated. WWTP1 could become part of the area used for National Guard training activities. National Guard trainees, however, may be less exposed to any of the potentially contaminated media than the receptors identified previously. Because they would likely not represent an upper bound for

nonresidential exposure, these receptors are not evaluated. The WWTP1 drainage ditches do not support game fish. Therefore, fish ingestion as an indirect pathway for exposure to surface water and sediment is not evaluated. Also, as discussed in Section 3.1, off-site use of groundwater is not evaluated because nearby residents use municipal water from surface water sources as a potable source, and potential on-site users would be exposed to higher concentrations of contaminants in groundwater.

3.2 Quantification of Exposure-Point Concentrations

The EPC is an estimate of the concentration of a COPC in a given medium to which a receptor may be exposed over the duration of the exposure. An EPC may be based on chemical concentrations in media that have been directly measured using laboratory analysis, or it may be derived based on environmental medium-to-medium transport modeling. The EPCs of COPCs in soil, groundwater, surface water, and sediment are derived based on measured analytical data. Note that the EPC for dermal exposure to VOCs in groundwater is based on one-half the EPC concentration derived from the measured concentrations in groundwater (Sections 3.2.1 and 3.2.2.3). This value is used because it is assumed that 50 percent of the groundwater VOC concentration is volatilized during normal household use (Section 3.2.2.2). Concentrations of COPCs in air and venison are not measured (and in some cases cannot reasonably be measured) but are based on models that use the EPCs of COPCs in the appropriate directly measured media (i.e., soil and groundwater) as input values.

Section 3.2.1 describes the approaches used to derive EPCs for direct exposure to soil, groundwater, surface water, and sediment based on analytical measurements from samples of these media. Models to derive EPCs for the air are described in Sections 3.2.2.1 and 3.2.2.2, and the model used to derive venison EPCs is described in Section 3.2.2.4.

3.2.1 Soil, Groundwater, Surface Water, and Sediment Concentrations

Exposure to an environmental medium is generally assumed to be random, and the EPC should be the arithmetic average encountered over the duration of exposure (EPA, 1989a). Therefore, the population mean concentration, if known, would be the ideal value selected as the EPC. The sample mean is an obvious estimate of the population mean. However, uncertainties exist as to how well the sample mean represents the population mean. Therefore, EPA (1989a) has recommended the inclusion of a UCL for RME evaluation as a conservative estimate of the true mean exposure concentration.

The EPA (2010a,b,c) ProUCL (Version 4.00.05) software was used to estimate UCLs for the data sets of all environmental media represented by at least five samples. If the data set consists

of fewer than five data points, the MDC was selected as the EPC. Analytical data from field duplicates are averaged with originals to yield one result for use in the statistical manipulations (Section 2.5). One-half the reporting limit is used as the ProUCL input concentration for nondetects. Nondetect sample results with aberrantly high detection limits due to matrix interferences or other sample-specific causes are included in the initial ProUCL calculations. This is a conservative approach, as EPA (1989a) recommends that nondetect results with aberrantly high detection limits be removed from the data set so that calculation of the UCL is not unduly skewed by a nondetect. Because the latest version of ProUCL (EPA, 2010a) includes mathematical manipulations under the default "with NDs" mode that are more robust than previous versions, single elevated detection limits are less likely to skew the UCL estimates than in the past. If it is observed during the risk characterization that an elevated nondetect value skews a UCL estimate such that this value substantially affects the result of the risk estimate, the ProUCL model is rerun without the elevated nondetect value and the risks are recalculated. If this recalculation is performed on a data set, data eliminated for the recalculation are identified in the risk characterization and discussed in the uncertainty analysis. The re-evaluation of elevated nondetects was not performed in the WWTP1 BHHRA.

ProUCL generates a variety of UCL estimates for each data set. The ProUCL output for each COPC is included in Appendix B. Generally, the results of one or two (sometimes more) of the UCL estimates are recommended. This recommendation is based on a variety of factors, including the distribution (i.e., normal, lognormal, gamma, or not discernable) that provides the best fit, number of nondetects, size of the data set, and skewness. If the recommended value(s) under the default mode equals or exceeds the MDC, ProUCL is rerun using the full data set mode, under the assumption that the COPC is present in nondetects at one-half the reporting limit. Occasionally, ProUCL recommends the 97.5 or 99 percent upper confidence limit on the arithmetic mean estimated by the Chebyshev method. In these cases, the UCL estimated by the Chebyshev method (95th percent) is selected as the EPC because this is more consistent with the intent of the RME paradigm as defined by EPA (1989a; 1991a).

The UCL generated by the ProUCL protocol described in the preceding paragraphs or the MDC, whichever is smaller, is selected as the EPC and is understood to represent a conservative estimate of average for use in the risk assessment or in various transport models used to estimate EPCs. Note that EPA (1989a) guidance states that an estimate of average rather than the MDC should be used to represent the EPC under chronic exposure and that use of the maximum is typically not reasonable. Therefore, data sets which use the MDC as the EPC are generally biased high. Unusually high detected values are included in the calculation of the UCL

concentration. Inclusion of these high values increases the statistical variability and the overall conservativeness of the risk estimate.

ProUCL is a software tool that provides estimates of the UCL using a variety of mathematical approaches. As mentioned, its output includes one or more recommendations. Depending on the data set, some of the estimates generated by the various calculation methods included in ProUCL may vary by an order of magnitude. ProUCL and the decision tree on which its recommendations are based have been developed using multitudes of simulated data sets with a variety of distributions and other characteristics. There are uncertainties as to how well this decision tree derives a recommended UCL for a given data set. This uncertainty tends to increase with variability and skewness and where a large number of the samples are nondetects. For example, with respect to distribution testing, ProUCL bases the determination of distribution type only on the detected samples. The true concentrations of the nondetected values are unknown, and this lack of information can affect the distribution determination and consequently affect the ProUCL recommendation. The general uncertainties associated with the EPC values and the use of ProUCL are discussed in the uncertainty analysis (Chapter 6.0). Specific uncertainties associated with the EPC values of specific data sets may be discussed in the uncertainty analysis as appropriate.

3.2.2 Exposure-Point Concentrations in Air

The models shown in the following subsections for estimating COPC concentrations in air include only those relevant and used specifically for WWTP1 COPCs and media.

3.2.2.1 COPC Concentrations from Dust

Inhalation exposure to particulate (dust) emissions from soils for the groundskeeper and construction worker evaluations arises from activities that raise dust. Therefore, the most appropriate approach for estimating chemical concentrations in ambient air is the use an activity-based dust loading equation (U.S. Department of Energy [DOE], 1989):

Eq. 3.1

$$C_a = (D)(C_s)(CF_1)$$

where:

C_a = contaminant concentration in air (milligrams per cubic meter [mg/m^3], calculated)
D = dust loading factor (grams [g] of soil/m^3 of air)
C_s = contaminant concentration in soil (mg/kg)
CF_1 = conversion factor (1E-3 kg per g).

Plausible values for D include 2E-4 grams per cubic meter (g/m^3) for agricultural activity (DOE, 1989), 6E-4 g/m^3 for construction work (DOE, 1983), and 1E-4 g/m^3 for other activity (National Council on Radiation Protection and Measurements, 1984). The value for D of 1E-4 g/m^3 for other activity is used for the groundskeeper. It is assumed that construction activities requiring intensive contact with soil, for which D = 6E-4 g/m^3 is appropriate, may last for one-half of a construction period. The remaining one-half of the time is more realistically characterized by D = 1E-4 g/m^3. Therefore, a time-weighted average dust loading factor for construction work of 3.5E-4 g/m^3 is estimated for the construction worker.

Airborne concentrations of VOCs estimated by the dust loading model are assumed to sufficiently estimate levels of VOCs that may arise from volatilization, because the dust loading model treats the VOCs as if they were located at the ground surface.

The resident is more likely to be exposed to dust arising from wind erosion than from dust-raising activities on the site. EPA (1996) derived a model for estimating a dust particulate emission factor (PEF) based on an "unlimited reservoir" model and the assumption that the source area is square:

Eq. 3.2

$$PEF = Q/C \times \frac{3600}{0.036 \times (1 - V) \times (U_m / U_t)^3 \times F(x)}$$

where:

PEF	=	particulate emission factor (cubic meters per kilogram [m^3/kg], calculated)
Q/C	=	inverse of the mean concentration at center of square source (55.99 grams per square meter-second per kg/m^3, site-specific value from Table 3 in EPA [1996] [Zone 7, Cleveland, 5-acre site])
3600	=	seconds/hour
V	=	fraction of surface covered with vegetation (0.8, unitless, assumed)
U_m	=	mean annual wind speed (default, 4.60 meters per second [m/second] equals mean annual wind speed of 10.3 miles per hour [Section 3.1.1])
U_t	=	equivalent threshold value of wind speed at 7 meters (default, 11.32 m/second)
F(x)	=	function dependent on U_m/U_t (default, 0.194).

The concentration of a COPC in air is calculated as follows:

Eq. 3.3

$$C_a = \frac{C_s}{PEF}$$

where:

C_a = contaminant concentration in air (mg/m^3, calculated)
C_s = contaminant concentration in soil (mg/kg)
PEF = particulate emission factor (m^3/kg).

Airborne concentrations of VOCs estimated by the wind erosion model are assumed to sufficiently estimate levels of VOCs that may arise from volatilization, because the wind erosion model treats the VOCs as if they were located at the ground surface.

3.2.2.2 Concentrations in Household Air from Groundwater Use

The inhalation of VOCs released from groundwater, which is assumed to be used as tap water, is evaluated for the on-site residential scenario. Chemicals that have a Henry's Law value exceeding 1E-5 atmospheres/m^3-mole and a molecular weight less than 200 g/mole are considered to be VOCs and are subject to evaluation via this pathway; Henry's Law values and molecular weights are presented in Table 3-3. Other groundwater contaminants are considered on a case-by-case basis for their potential contribution to risk via the inhalation pathway based on the degree of departure from the Henry's Law and molecular weight criteria, groundwater concentration, and toxicity.

The simple whole-house tap water-to-air model described in Part B of the EPA (1991b) Human Health Evaluation Manual (HHEM) was used to evaluate the tap water-to-air pathway. This model was selected based on correspondence between OEPA (2004b) and USACE. Part B of the HHEM recommends a volatilization constant of 0.0005 for the total concentrations of all VOCs detected in groundwater; the conversion is characterized by the following equation:

Eq. 3.4

$$C_a = C_{gw} \times K_{wa} \times 1{,}000 \, {}^{L}\!/_{m^3}$$

where:

C_a = modeled concentration in air (mg/m^3)
C_{gw} = groundwater EPC (mg/L)
K_{wa} = tap water-to-air volatilization constant (0.0005 [unitless] [EPA, 1991b])

Implicit in the HHEM Part B application of this model are the following assumptions: 1) A family of four uses the groundwater as the sole source of household tap water, 2) the volume of the house is 150 m^3, 3) the daily groundwater use is 720 L/day, 4) 50 percent of VOCs in tap water volatilize to household air, and 5) the air exchange rate of the house is 0.25 volumes per hour (EPA, 1991b).

3.2.2.3 Concentrations of VOCs in Groundwater: Resident Dermal Uptake

Volatilization of VOCs from household water reduces the remaining concentration available for dermal contact. As mentioned in Section 3.2.2.2, the HHEM Part B whole-house tap water-to-air model assumes that 50 percent of the VOC concentrations are released to household air. Thus, the concentrations of VOCs remaining in the water after volatilization occurs are calculated by difference as follows:

Eq. 3.5

$$C_d = C_{gw} \times (1 - F_v)$$

where:

C_d = concentration of VOC in household water available for dermal exposure (mg/L, calculated)
C_{gw} = concentration of VOC in groundwater (mg/L)
F_v = fraction of VOCs volatilized to air, (0.5 unitless).

Only the concentration remaining in tap water after volatilization (C_d), as applicable, is assumed to be available for contact with the skin during bathing/showering.

3.2.2.4 Exposure-Point Concentrations of COPCs in Venison

The hunter is assumed to harvest and consume game and share it with family members, including small children. The game is assumed to be venison, because the white-tailed deer is the species hunted most widely and most likely to provide a regular contribution to the diet. Data to reliably estimate contaminant concentrations in venison do not exist, but the following simplifying assumptions permit estimates sufficient for a BHHRA.

- Deer are small ruminants and, as such, are not unlike cattle; thus, it is reasonable to assume they may have similar physiological processes that could yield similar biotransfer factors. Unlike beef, however, deer meat does not undergo marbling with fat, and deer fat is quite unpalatable and is likely to be trimmed rather than consumed. Therefore, the biotransfer factors for edible venison are derived by adjusting biotransfer factors for beef to account for differences in the fat content of table-ready beef (cooked choice retail cuts trimmed to 0 inches of fat: average 14.4 percent fat) and venison (cooked boneless muscle meats: average 2.9 percent fat) (Nutrient Database, 1997).

- Deer are expected to browse a much larger area than that encompassed in WWTP1; therefore, the fraction of total browse consumed from WWTP1 is expected to be relatively small.

- Indirect food chain pathways may be significant for some metals and for those semivolatile organic compounds that persist in the environment and have the tendency to bioaccumulate. VOCs are generally mobile in the environment and labile in biological systems and do not tend to bioaccumulate.

To reflect the assumptions previously noted, venison biotransfer factors are estimated by multiplying beef biotransfer factors by 2.9/14.4 (or 0.20), and by a fraction, FI_r. This fraction reflects the areal portion of the site compared to a deer's home range area. These assumptions are captured in the following equation:

Eq. 3.6

$$B_v = 0.20(B_b)(FI_r)$$

where:

B_v	=	biotransfer factor for venison (unitless, calculated)
0.20	=	factor to reflect differences in fat content between beef and venison (0.20, unitless, see above)
FI_r	=	areal portion of site compared to a deer's home range (0.03, unitless, see below)
B_b	=	biotransfer factor for beef.

Values for B_b for metals are provided in the toxicity profiles (Appendix C). Toxicity profiles are prepared for each of the COPCs. The toxicity profiles briefly describe the uses of the chemical, its physical properties, behavior in environmental media, biotransfer capability, and toxicity values.

The WWTP1 areas are relatively small in comparison to the home range of a white-tailed deer. The total acreage of the WWTP1 study area is approximately 2 acres. The home range of the white-tailed deer is between 150 and 1,280 acres (Sample and Suter, 1994). Even if the low end of this range (150 acres) is assumed for deer in northern Ohio, the area represented by WWTP1 is approximately 1.5 percent of this land area. Although the use of FI_r equal to 0.015 or lower is justified, an FI_r value of 0.03 is used in the BHHRA to be consistent with other small sites evaluated at PBOW.

Deer are assumed to be exposed to contaminants by ingesting browse growing on contaminated soil. It is estimated that deer consume approximately 1.74 kg of browse per day (Sample, et al., 1996), which is approximately 50 percent dry matter (DM), or 0.87 kg browse DM per day (Mautz, et al., 1976). The contaminant concentration in browse is estimated from the following equation, which was originally developed for estimating the contaminant concentration in forage to which cattle may be exposed (EPA, 1994):

Eq. 3.7

$$C_p = (CF)(C_s)(B_p)$$

where:

C_p	=	concentration of contaminant in (plant) forage DM (mg/kg, calculated)
CF	=	conversion factor to adjust for soil containing 20 percent moisture (1.25, unitless).
C_s	=	concentration of contaminant in soil (mg/kg)
B_p	=	soil-to-forage biotransfer factor (mg of chemical per kg of dry plant/mg of chemical per kg of dry soil).

Values for B_p are taken from the toxicity profiles in Appendix C. B_p values for the vegetative parts of plants, rather than the reproductive parts of plants, are selected, as possible, because deer browse year-round, and the vegetative parts are more available for the greater part of the year.

The concentration of a COPC in venison can be estimated from the following equation (adapted from EPA [1994]):

Eq. 3.8

$$C_v = (Q_p)(C_p)(B_v)$$

where:

C_v	=	contaminant concentration in venison (mg/kg, calculated)
Q_p	=	browse ingestion rate (0.87 kg DM/day)
C_p	=	contaminant concentration in browse DM (mg/kg)
B_v	=	biotransfer factor for venison (days/kg).

3.3 Quantification of Chemical Intake

This section describes the models used to quantify doses or intakes of the COPCs by the exposure pathways identified above. Models were taken or modified from EPA (1989a) unless otherwise indicated.

3.3.1 Inhalation of COPCs in Air

The inhaled dose of a COPC in air (for the groundskeeper, construction worker, on-site resident: inhalation of dust and VOCs in ambient air from surface or total soil; for the construction worker: inhalation of VOCs in ambient air from subsurface soil; for the indoor worker and on-site resident: inhalation of VOCs in indoor air from subsurface soil) is estimated as follows:

Eq. 3.9

$$I_a = \frac{(C_a)(FI_a)(IR_a)(EF)(ED)}{(BW)(AT)}$$

where:

I_a	=	inhaled dose of COPC (milligrams per kilograms per day [mg/kg-day], calculated)
C_a	=	concentration of COPC in air (mg/m^3)
FI_a	=	fraction of exposure attributed to site media (unitless)
IR_a	=	inhalation rate (m^3/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days).

3.3.2 Incidental Ingestion of COPCs in Soil or Sediment

The ingested dose of a COPC in soil (groundskeeper, construction worker, resident, indoor worker, hunter) or sediment (construction worker, resident) is estimated from the following equation:

Eq. 3.10

$$I = \frac{(C)(FI)(IR)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

I	=	I_s for soil, I_{sd} for sediment, = ingested dose of COPC (mg/kg-day, calculated)
C	=	C_s for soil; C_{sd} for sediment; = concentration of COPC (mg/kg)
FI	=	FI_s for soil; FI_{sd} for sediment; = fraction of exposure attributed to site medium (unitless)
IR	=	IR_s for soil; IR_{sd} for sediment; = ingestion rate of medium (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1E-6 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days).

3.3.3 Incidental Ingestion of COPCs in Water

The ingested dose of a COPC in groundwater (future groundskeeper, resident) is estimated from the following equation:

$$I_w = \frac{(C_w)(IR_w)(FI_w)(EF_w)(ED_w)}{(BW)(AT)}$$ Eq. 3.11

where:

I_w = ingested dose of COPC in water (mg/kg-day, calculated)
C_w = concentration of COPC in water (mg/L)
IR_w = water ingestion rate (L/day)
FI_w = fraction of exposure attributed to site water (unitless)
EF_w = fraction of exposure attributed to site water exposure frequency (days/year)
ED_w = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days).

3.3.4 Dermal Contact with COPCs in Soil, Sediment, or Water

Unlike the methodologies for estimating inhaled or ingested doses of a COPC, which quantify the dose presented to the barrier membrane (the pulmonary or gastrointestinal mucosa, respectively), dermal dose is estimated as the dose that crosses the skin and is systemically absorbed. For this reason, dermal toxicity values are also based on absorbed dose. The absorbed dose of a COPC is estimated from the following equation (EPA, 2004a):

Eq. 3.12

$$DAD = \frac{(DA)(SA)(EF)(ED)}{(BW)(AT)}$$

where:

DAD = average dermally absorbed dose of COPC (mg/kg-day, calculated)
DA = dose absorbed per unit body surface area per day (milligrams per square centimeter per day [mg/cm^2-day])
SA = SA_s for soil, SA_{sd} for sediment, S_{gw} for groundwater, SA_{sw} for surface water, = surface area of the skin exposed (cm^2)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days).

Dose absorbed per unit body surface area per day (DA) is calculated differently for dermal uptake from soil/sediment and from water. Dermal uptake of constituents from soil (groundskeeper, construction worker, on-site resident, hunter) or sediment (construction worker, on-site resident) assumes that absorption is a function of the fraction of a dermally applied dose that is absorbed. DA is calculated from the following equation (EPA, 2004a):

Eq. 3.13

$$DA = (C_s)(FI_s)(CF)(AF)(ABS)$$

where:

DA	=	dose absorbed per unit body surface area per day (mg/cm^2-day, calculated)
C	=	C_s for soil, C_{sd} for sediment, = concentration of COPC in medium (mg/kg)
FI	=	FI_s for soil, FI_{sd} for sediment, = fraction of exposure attributed to site medium (unitless)
CF	=	conversion factor (1E-6 kg/mg)
AF	=	AF_s for soil, AF_{sd} for sediment, = soil- or sediment-to-skin adherence factor (mg/cm^2-day)
ABS	=	absorption fraction (unitless, chemical-specific).

ABS values are provided in the toxicity profiles for each COPC (Appendix C).

Quantification of dermal uptake of constituents from groundwater (future groundskeeper, resident) or surface water (construction worker, resident) depends on a K_p, which describes the rate of movement of a constituent from water across the dermal barrier to the systemic circulation (EPA, 2004a). The equation for dermal uptake of chemicals from water is the same as the equation for dermal uptake of chemicals from soil (Eq. 3.12). DA is calculated differently for inorganic and organic chemicals in water. For inorganic chemicals, DA is calculated from the following equation:

Eq. 3.14

$$DA = (C_w)(FI)(K_p)(ET_w)(CF)$$

where:

DA	=	dose absorbed per unit body surface area per day (mg/cm^2-day, calculated)
C_w	=	concentration of COPC in water (mg/L)
K_p	=	permeability coefficient (centimeters per hour [cm/hour])
ET_w	=	time of exposure (hours/day)
CF	=	conversion factor (1E-3 liters per cubic centimeter [L/cm^3]).

K_p for organic chemicals varies by several orders of magnitude and is highly dependent on lipophilicity, expressed as a function of the octanol/water partition coefficient (EPA, 2004a). Because the stratum corneum (the outer skin layer) is rich in lipid content, it may act as a sink, initially reducing the transport of chemical to the systemic circulation. With continued exposure and the attainment of steady-state conditions, the rate of dermal uptake increases. Therefore, different equations are used to estimate DA, depending on whether the ET is less than or greater than the estimated time to reach steady state. Non-steady-state exposures occur when either the ET is relatively brief (e.g., showering, for most chemicals) or when intermittent exposure occurs throughout the day (e.g., wading exposure to surface water or washing of hands). For exposure

scenarios under which steady state is not reached for a given organic chemical (τ> ET, see below), the following equation is used to calculate DA (EPA, 2004a):

Eq. 3.15

$$DA = 2(FA)(K_p)(C_w)(CF)\sqrt{\left(\frac{6\tau(ET_w)}{\pi}\right)}$$

where:

DA	=	dose absorbed per unit body surface area per day (mg/cm^2-day, calculated)
C_w	=	C_{sw} for surface water, C_{gw} for groundwater, = concentration of COPC in water (mg/L)
FA	=	fraction absorbed from the water (unitless)
K_p	=	permeability coefficient (cm/hour)
CF	=	conversion factor (1E-3 L/cm^3)
τ	=	time for concentration of contaminant in stratum corneum to reach steady state per event (hours)
ET_w	=	time of contact (hour(s)/day).

In cases where steady state is reached (τ<ET), such as where the duration of a bath exceeds the time to reach steady state for a given organic compound, the following equation is used to calculate DA (EPA, 2004a):

Eq. 3.16

$$DA = (FA)(K_p)(C_w)(CF)\left[\frac{ET_w}{1+B} + 2\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

where:

DA	=	dose absorbed per unit body surface area per day (mg/cm^2-day, calculated)
C_w	=	concentration of COPC in water (mg/L)
FA	=	fraction absorbed from the water (unitless)
K_p	=	permeability coefficient (cm/hour)
CF	=	conversion factor (1E-3 L/cm^3)
τ	=	time for concentration of contaminant in stratum corneum to reach steady state per event (hours)
ET_w	=	time of contact (hour[s]/day)
B	=	Ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (unitless).

Assuming one exposure event/day allows expressing ET as hour(s)/day, which preserves the dimensional integrity of the equation.

When available, values for K_p and τ are taken from EPA (2004a). For organics that have no K_p values listed, the values are calculated using the following equation (EPA, 2004a):

Eq. 3.17

$$\text{Log}(K_p) = -2.80 + 0.66(\log K_{ow}) - 0.0056(MW)$$

where:

K_p	=	permeability coefficient (cm/hour, calculated)
log K_{ow}	=	log of the octanol/water partition coefficient (unitless)
MW	=	molecular weight.

Where values for τ are not available, they were calculated using the following equation (EPA, 2004a).

Eq. 3.18

$$\tau = 0.105 \times 10^{(0.0056 \times MW)}$$

where:

τ	=	time for concentration of contaminant in stratum corneum to reach steady state (hours, calculated)
MW	=	molecular weight.

Values of K_p and τ used in the BHHRA are summarized in Table 3-3 and documented in Appendix C.

3.3.5 Consumption of Venison

Consumption of venison by the hunter or the hunter's child is evaluated by the following equation:

Eq. 3.19

$$I_v = \frac{(C_v)(IR_v)(EF)(ED)}{(BW)(AT)}$$

where:

I_v	=	ingested dose of COPC in venison (mg/kg-day, calculated)
Cv	=	concentration of COPC in venison (mg/kg)
IRv	=	venison ingestion rate (kg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days).

4.0 Toxicity Evaluation

Toxicity is defined as the ability of a chemical to induce adverse effects in biological systems. The purpose of the toxicity assessment is two-fold:

- Identify the cancer and noncancer effects that may arise from exposure of humans to the COPC (hazard assessment).
- Provide an estimate of the quantitative relationship between the magnitude and duration of exposure and the probability or severity of adverse effects (dose-response assessment).

The latter is accomplished by the derivation of cancer and noncancer toxicity values, as described in the following sections.

4.1 Evaluation of Carcinogenicity

A few chemicals are known, and many more are suspected, to be human carcinogens. The evaluation of the potential carcinogenicity of a chemical includes both a qualitative and a quantitative aspect (EPA, 2005). The qualitative aspect is a weight-of-evidence evaluation of the likelihood that a chemical might induce cancer in humans. EPA (2005) recognizes five weight-of-evidence group classifications for carcinogenicity. Formerly, EPA (1986) used a letter-based system to describe the weight of evidence for carcinogenicity. Reference to this former system is included because many of the carcinogenicity assessments listed on the Integrated Risk Information System (IRIS) use the former letter-based system (EPA, 2011b). The five EPA weight-of-evidence classifications are as follows:

- ***Carcinogenic to Humans*** (corresponds to the former Group A - Human Carcinogen)
- ***Likely to be Carcinogenic to Humans*** (includes both the former Group B1 and Group B2-Probable Human Carcinogens)
- ***Suggestive Evidence of Carcinogenic Potential*** (corresponds to the former Group C - Possible Human Carcinogen)
- ***Inadequate Information to Assess Carcinogenic Potential*** (corresponds to the former Group D - Not Classifiable as to Human Carcinogenicity)
- ***Not Likely to be Carcinogenic to Humans*** (corresponds to the former Group E - Evidence of Noncarcinogenicity to Humans).

The toxicity value for carcinogenicity, called a cancer slope factor (SF), is an estimate of potency. SFs are developed only for chemicals in the first three groups and only if the data are sufficient. The SFs are statistically derived from the dose-response curve from the best human or animal study or studies of the chemical. Although human data are often considered to be more reliable than animal data because there is no need to extrapolate the results obtained in one species to another, most human studies have one or more of the following limitations:

- The duration of exposure is usually considerably less than lifetime.
- The concentration or dose of chemical to which the humans were exposed can be approximated only crudely, usually from historical data.
- Concurrent exposure to other chemicals frequently confounds interpretation.
- Data regarding other factors (tobacco, alcohol, illicit or medicinal drug use, nutritional factors and dietary habits, heredity) are usually insufficient to eliminate or quantify confounding effects on the results.
- Most epidemiologic studies are occupational investigations of workers, which may not accurately reflect the range of sensitivities of the general population.
- Most epidemiologic studies lack the statistical power (i.e., sample size) to detect a low, but chemical-related increased incidence of tumors.

Most potency estimates are derived from animal data, which present different limitations:

- It is necessary to extrapolate from results in animals to predict results in humans, usually by estimating an equivalent human dose from the animal dose.
- The range of sensitivities arising from genotypic and phenotypic diversity in the human population is not reflected in the animal models ordinarily used in cancer studies.
- Usually, very high doses of chemical are used, which may alter normal biology, creating a physiologically artificial state and introducing substantial uncertainty regarding the extrapolation to the low-dose range expected with environmental exposure.
- Individual studies vary in quality (e.g., duration of exposure, group size, scope of evaluation, adequacy of control groups, appropriateness of dose range, absence of concurrent disease, sufficient long-term survival to detect tumors with long induction or latency periods).

The SF is usually expressed as "extra risk" per unit dose, that is, the additional risk above background in a population corrected for background incidence, and it is expressed as risk per

mg/kg-day, shown mathematically as $(mg/kg\text{-}day)^{-1}$. To be appropriately conservative, the SF is usually the 95 percent upper bound on the slope of the dose-response curve extrapolated from high (experimental) doses to the low-dose range expected in environmental exposure scenarios. EPA (2005) assumes that there are no thresholds for carcinogenic expression; therefore, any exposure represents some quantifiable risk, however miniscule it may be.

The oral SF is usually derived directly from the experimental dose data, because oral dose is usually expressed as mg/kg-day. When the test chemical was administered in the diet or drinking water, oral dose first must be estimated from data for the concentration of the test chemical in the food or water, food or water intake data, and body weight data.

IRIS (EPA, 2011b) expresses inhalation cancer potency as a unit risk based on concentration, or risk per microgram of chemical per m^3 of ambient air, shown mathematically as (micrograms per cubic meter [$\mu g/m^3$])$^{-1}$. Because cancer risk characterization requires an SF expressed as risk per mg/kg-day, the unit risk must be converted to the mathematical equivalent of an inhalation cancer SF, or risk per unit dose as $(mg/kg\text{-}day)^{-1}$. Because the inhalation unit risk is based on continuous lifetime exposure of an adult human (assumed to inhale 20 m^3 of air per day and to weigh 70 kg), the mathematical conversion consists of multiplying the unit risk (per $\mu g/m^3$) by 70 kg and by 1,000 µg/mg, and dividing the result by 20 m^3 per day.

4.2 Evaluation of Noncarcinogenic Effects

Many chemicals, whether or not associated with carcinogenicity, are associated with adverse noncarcinogenic effects. The evaluation of noncancer effects (EPA, 1989b) involves the following:

- Qualitative identification of the adverse effect(s) associated with the chemical; these may differ depending on the duration (acute or chronic) or route (oral or inhalation) of exposure.
- Identification of the critical effect for each duration of exposure (i.e., the first adverse effect that occurs as dose is increased).
- Estimation of the threshold dose for the critical effect for each duration of exposure.
- Development of an uncertainty factor (UF); i.e., quantification of the uncertainty associated with interspecies extrapolation, intraspecies variation in sensitivity, severity of the critical effect, slope of the dose-response curve, and deficiencies in the database, in regard to developing a reference dose (RfD) for human exposure.
- Identification of the target organ(s) for the critical effect for each route of exposure.

These information points are used to derive an exposure route- and duration-specific toxicity value called an RfD, expressed as mg/kg-day, which is considered to be the dose for humans, with uncertainty of an order of magnitude or greater, at which adverse effects are not expected to occur. Mathematically, it is estimated as the ratio of the threshold dose to the UF. For purposes of risk assessment, chronic exposure is typically defined as equal to or greater than 7 years, i.e., at least 10 percent of expected life span; subchronic exposure is typically defined as 2 weeks to 7 years. However, professional judgment may be used where exposure durations approach 10 percent of the expected life span. Also, exposure during a critical stage of development, such as a portion of early childhood, may be treated as chronic even if the anticipated exposure duration is considerably less than 10 percent of the expected life span.

IRIS (EPA, 2011b) expresses the inhalation noncancer reference value as a reference concentration (RfC) in units of mg/m^3. Because noncancer hazard characterization requires a reference value expressed as mg/kg-day, the RfC must be converted to an inhalation RfD. Because the inhalation RfC is based on continuous exposure of an adult human (assumed to inhale 20 m^3 of air per day and to weigh 70 kg), the mathematical conversion consists of multiplying the RfC (mg/m^3) by 20 m^3/day and dividing the result by 70 kg.

RfD and RfC values are derived for both chronic and subchronic exposure. Under the assumption of monotonicity (incidence, intensity, or severity of effects can increase, but cannot decrease, with increasing magnitude or duration of exposure), a chronic RfD may be considered sufficiently protective for subchronic exposure, but a subchronic RfD may not be protective for chronic exposure. Currently, subchronic RfD values exist for few chemicals. Subchronic RfD values can be derived from chronic RfD values as follows:

- If the UF applied in the derivation of the chronic RfD (or RfC) does not provide for expansion from subchronic to chronic exposure (e.g., if the chronic RfD was derived from a chronic study), the chronic RfD is adopted as being sufficiently protective for subchronic exposure.

- If the UF applied in the derivation of the chronic RfD (or RfC) contains a component to expand from subchronic to chronic exposure, the subchronic RfD is derived by multiplying the chronic RfD by the factor used to expand from subchronic to chronic exposure (e.g., if a factor of 10 was used to expand from subchronic to chronic exposure, the subchronic RfD would be 10 times larger than the chronic RfD).

Only chronic RfDs and RfCs are used in the risk characterization of this BHHRA.

4.3 Dermal Toxicity Values

Dermal RfDs and SFs are derived from the corresponding oral values, provided there is no evidence to suggest that dermal exposure induces exposure route-specific effects that are not appropriately modeled by oral exposure data. In the derivation of a dermal RfD, the oral RfD is multiplied by the gastrointestinal absorption factor (GAF), expressed as a decimal fraction. The resulting dermal RfD, therefore, is based on absorbed dose. The RfD based on absorbed dose is the appropriate value with which to compare a dermal dose, because dermal doses are expressed as absorbed doses rather than exposure doses. The dermal SF is derived by dividing the oral SF by the GAF. The oral SF is divided, rather than multiplied, by the GAF because the SF is expressed as a reciprocal dose.

4.4 Target Organ Toxicity

As a matter of science policy, EPA assumes dose and effect to be additive for noncarcinogenic effects (EPA, 1989a). This assumption provides the justification for adding the HQ or hazard index (HI) values in the risk characterization for noncancer effects (Section 5.2) resulting from exposure to multiple chemicals, pathways, or media. However, EPA (1989a) acknowledges that adding all HQ or HI values may overestimate hazard, because the assumption of additivity is probably appropriate only for those chemicals that exert their toxicity by the same mechanism.

Mechanisms of toxicity data sufficient for predicting additivity with a high level of confidence are available for very few chemicals. In the absence of such data, EPA (1989a) assumes that chemicals that act on the same target organ may do so by the same mechanism of toxicity; that is, the target organ serves as a surrogate for mechanism of toxicity. When total HI for all media for a receptor exceeds 1 due to the contributions of several chemicals, it is appropriate to segregate the chemicals by route of exposure and mechanism of toxicity (i.e., target organ) and estimate separate HI values for each target organ.

As a practical matter, because human environmental exposures are likely to involve near- or sub-threshold doses, the target organ chosen for a given chemical is the one associated with the critical effect. If more than one organ is affected by a given chemical at the threshold, then all affected target organs are selected for this chemical. The target organ is also selected on the basis of duration of exposure (i.e., the target organ for chronic or subchronic exposure to low or moderate doses is selected rather than the target organ for acute exposure to high doses) and route of exposure. Because dermal RfD values are derived from oral RfD values, the oral target organ is adopted as the dermal target organ. For some chemicals, no target organ is identified. This occurs when no adverse effects are observed or when adverse effects such as reduced

longevity or growth rate are not accompanied by recognized organ- or system-specific functional or morphologic alteration.

4.5 Sources of Toxicity Information Used in the Risk Assessment

Toxicity values were selected for use in the BHHRA based on EPA Office of Solid Waste and Emergency Response Directive 9285.7-53 (EPA, 2003), which prescribes the following hierarchy:

- **Tier 1** values: IRIS (EPA, 2011b) database.
- **Tier 2** values: These are EPA's provisional peer-reviewed toxicity values. The provisional peer-reviewed toxicity values are developed by the Office of Research and Development, the National Center for Environmental Assessment, and the Superfund Health Risk Technical Support Center on a chemical-specific basis when requested by the Superfund program.
- **Tier 3** values: These are other toxicity values from additional EPA and non-EPA sources of toxicity information. As stated in the EPA Office of Solid Waste and Emergency Response directive, "priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer reviewed." Two common examples of Tier 3 values are EPA's Health Effects Assessment Summary Tables (EPA, 1997b) and the California Environmental Protection Agency (2011) Office of Environmental Health Hazard Assessment Toxicity Criteria Database.

The Environmental Council of the States-U.S. Department of Defense (2007) has issued a toxicity value hierarchy that basically supports the EPA (2003) hierarchy presented previously but places higher emphasis on the necessity for external peer review.

GAFs used to derive dermal RfD values and SFs from the corresponding oral toxicity values are obtained from the following sources, in order of hierarchy:

- Oral absorption efficiency data compiled by the National Center for Environmental Assessment for the Superfund Health Risk Technical Support Center of EPA, such as listed in EPA (2004a).
- Federal agency reviews of the empirical data, such as Agency for Toxic Substances and Disease Registry toxicological profiles and various EPA criteria documents
- Other published reviews of the empirical data
- The primary literature.

GAFs obtained from reviews are compared to empirical (especially more recent) data, when possible, and are evaluated for suitability for use in deriving dermal toxicity values from oral toxicity values. Some of the GAF values are also listed on the RSL Web site support tables (EPA, 2010f). The suitability of the GAF increases when the following similarities are present in the oral pharmacokinetic study from which the GAF is derived and in the key toxicity study from which the oral toxicity value is derived:

- The same strain, sex, age, and species of test animal were used.
- The same chemical form (e.g., the same salt or complex of an inorganic element or organic compound) was used.
- The same mode of administration (e.g., diet, drinking water, or gavage vehicle) was used.
- Similar dose rates were used.

Individual COPC-specific toxicity profiles, including sources of the toxicity and GAF values, are included in Appendix C for all of the COPCs evaluated in the BHHRA. Summary toxicity information sufficient to support the risk calculations, including toxicity values, GAFs, and target organs are provided in Table 4-1.

5.0 Risk Characterization

Risk characterization is the process of applying numerical methods and professional judgment to determine the potential for adverse human health effects to result from the presence of site-specific contaminants. This is done by combining the intake rates estimated during the exposure assessment with the appropriate toxicity information identified during the toxicity assessment. Noncancer hazards and cancer risks are characterized separately, including COPCs that induce both types of effects.

Quantitative expressions are calculated during risk characterization that describe the probability of developing cancer (i.e., ILCRs), or the nonprobabilistic comparison of estimated dose with an RfD for noncancer effects (i.e., HQs and HIs). Quantitative estimates are developed for individual chemicals, exposure pathways, and exposure media for each receptor. These quantitative risk characterization expressions, in combination with qualitative information, are used to guide risk management decisions. Risk characterization, as described in this section, is applied only to COPCs.

Generally, the risk characterization follows the methodology prescribed by EPA (1989a), as modified by more recent information and guidance. EPA methods are appropriately designed to be health protective and tend to overestimate rather than underestimate risk. The risk results, however, may be overly conservative, because risk characterization involves multiplication of the conservative assumptions built into the estimation of the EPCs, exposure (intake) estimates, and toxicity dose-response assessments.

5.1 Cancer Risk

The risk from exposure to potential chemical carcinogens is estimated as the probability of an individual developing cancer over a lifetime and is called the ILCR. In the low-dose range, which would be expected for most environmental exposures, cancer risk is estimated from the following linear equation (EPA, 1989a):

Eq. 5.1

$$ILCR = (CDI)\,(SF)$$

where:

ILCR = incremental lifetime cancer risk, a unitless expression of the probability of developing cancer, adjusted for background incidence, calculated

CDI = chronic daily intake, averaged over 70 years (mg/kg-day)
SF = cancer slope factor (risk per mg/kg-day).

The chronic daily intake (CDI) term in Equation 5.1 is equivalent to the "I" or "DAD" terms (intake or dose) in Equations 3.9 through 3.12 and 3.19 when these equations are evaluated for cancer intakes.

The use of Equation 5.1 assumes that chemical carcinogenesis does not exhibit a threshold and that the dose-response relationship is linear in the low-dose range. Because this equation could generate theoretical cancer risks greater than 1 for high-dose levels, it is considered to be inaccurate at cancer risks greater than 1E-2. In these cases, cancer risk is estimated by the following one-hit model (EPA, 1989a):

Eq. 5.2

$$ILCR = 1 - e^{-(CDI)(SF)}$$

where:

ILCR = incremental lifetime cancer risk, a unitless expression of the probability of developing cancer, adjusted for background incidence, calculated
$-e^{(CDI)(SF)}$ = the exponential of the negative of the risk calculated using Equation 5.1.

Because none of the COPCs had an ILCR greater than 1E-2 using Equation 5.1, it was not necessary to use Equation 5.2 for any of the WWTP1 COPCs. As a matter of policy, EPA (1986) considers the carcinogenic potency of simultaneous exposure to low doses of carcinogenic chemicals to be additive, regardless of the chemicals' mechanisms of toxicity or sites of action (organs of the body). Cancer risk arising from exposure to multiple chemicals in a given exposure medium and pathway is estimated from the following equation (EPA, 1989a):

Eq. 5.3

$$ILCR_p = ILCR_{(chem\,1)} + ILCR_{(chem\,2)} + \ldots ILCR_{(chem\,i)}$$

where:

$ILCR_p$ = total pathway risk of cancer incidence, calculated
$ILCR_{(chem\ i)}$ = individual chemical cancer risk for the pathway.

The sum of the ILCRs summed across pathways is the total ILCR as shown in the following equation:

Eq. 5.4

$$Total\ ILCR = ILCR_{(p\,1)} + ILCR_{(p\,2)} + \ldots ILCR_{(p\,i)}$$

where:

Total ILCR	=	total incremental lifetime cancer risk across all pathways
$ILCR_{pi}$	=	incremental lifetime cancer risks associate with pathway "*i*."

The total ILCR represents all additional cancer risks posed to a given receptor by contact with contaminants in site environmental media.

Total ILCRs in the range of 1E-6 to 1E-4 are regarded as acceptable (EPA, 1990); as mentioned in Section 2.4.1, this range is referred to as the "NCP risk management range." Risks less than this range are regarded as negligible. A target cancer risk goal of 1E-5 is used by OEPA and was selected by the PBOW Project Delivery Team as a basis to consider remedial action. Use of this 1E-5 goal represents a departure from the Army's practice of generally using a cancer risk exceeding a value of 1E-4 (the upper end of the NCP risk management range) to trigger remedial action considerations.

5.2 Noncancer Effects of Chemicals

The hazards associated with noncancer effects of chemicals are evaluated by comparing an exposure level or intake with an RfD. The HQ, defined as the ratio of intake to RfD, is estimated as follows (EPA, 1989a):

Eq. 5.5

$$HQ = I \ / \ RfD$$

where:

HQ	=	hazard quotient (unitless, calculated)
I	=	intake of chemical averaged over subchronic or chronic exposure period (mg/kg-day)
RfD	=	reference dose (mg/kg-day).

The I term in Equation 5.5 is equivalent to the "I" or "DAD" terms (intake or dose) in Equations 3.9 through 3.12 and 3.19 when these equations are evaluated for noncancer intakes.

Chemical noncancer hazards are evaluated using chronic RfD values. This approach is different from the probabilistic approach used to evaluate cancer risks. An HQ of 0.01 does not imply a 1-in-100 chance of an adverse effect, but indicates only that the estimated intake is 100 times lower than the RfD. An HQ of unity indicates that the estimated intake equals the RfD. If the HQ is greater than unity, there may be concern for potential adverse health effects.

In the case of simultaneous exposure of a receptor to multiple chemicals, or to a given chemical by multiple pathways, an HI is calculated as the sum of the HQs by the following equation:

Eq. 5.6

$$HI = HQ_1 + HQ_2 + \ldots HQ_i$$

where:

HI = hazard index (unitless, calculated)
HQ_i = hazard quotient for the ith chemical, or for the ith pathway.

A total HI is calculated as the sum of all HI values, including all media and all COPCs, for a given receptor. Calculating a total HI as the sum of HQ values is based on the assumption that the potential for noncancer effects is additive. EPA (1989a), however, acknowledges that the assumption of additivity is probably appropriate only for chemicals that induce adverse effects by the same mechanism (Section 4.4). Therefore, if the total HI for a receptor exceeds 1, individual HI values may be calculated for each target organ.

A total target organ HI is calculated by summing the HI values (associated by target organ[s]), across exposure pathways as follows:

Eq. 5.7

$$Total\ Target\ Organ\ HI_a = HI_{p1-a} + HI_{p2-a} + \ldots HI_{pi-a}$$

where:

Total target organ HI_a = total hazard index for target organ "*a*" (unitless, calculated)
HI_{pi-a} = hazard index for target organ "*a*" via pathway "*i*."

HI values of 1 or less indicate that adverse noncancer health effects associated with that target organ of any individual under the exposure assumptions for that receptor are unlikely. If the total target organ HI exceeds a value of 1, then adverse noncancer health effects concerning that target organ and receptor cannot be regarded as unlikely.

5.3 Risk Characterization Results

Cancer and noncancer risk characterization results were evaluated for each receptor and each environmental medium using the methods described in Sections 5.1 and 5.2. The following subsections describe the risk characterization results for each receptor evaluated for exposure at WWTP1. Risk summary tables are shown for each receptor as referenced. The detailed quantitative evaluation tables that include the exposure equations presented in Chapter 3.0, and the risk characterization equations presented in Chapter 5.0 are provided in Appendix D. Analytical results used as input in the BHHRA are included in Appendix E.

5.3.1 Current Groundkeeper

The ILCR for the current groundskeeper (Table 5-1) exposed to surface soil both through direct contact and via inhalation of suspended particulates is estimated as 2E-6. This is within the 1E-6 to 1E-4 NCP risk management range and is less than the PBOW cancer risk goal of 1E-5.

The total HI for the current groundskeeper (Table 5-1) is 0.07. This is less than the target HI value of 1, indicating that noncancer health effects are unlikely to occur.

5.3.2 Future Groundskeeper

The exposure assumptions for the future groundskeeper differ from those of the current groundskeeper (Section 5.3.1) in that the future groundskeeper is assumed to be exposed to total soil rather than surface soil, and the future groundkeeper is also assumed to be exposed to groundwater via direct contact (ingestion and dermal exposure). The risk characterization was run separately for bedrock groundwater exposure and overburden (well) groundwater exposure.

Bedrock Groundwater Use. The total ILCR for the future groundskeeper, assuming hypothetical bedrock groundwater use, is 8E-4 (Table 5-1). This value exceeds both the NCP risk management range and the PBOW target cancer risk goal of 1E-5. Over 99 percent of this ILCR is associated with benzene (8.3E-5) and arsenic (6.8E-4) in groundwater.

Benzene is a petroleum hydrocarbon constituent that is known to be naturally occurring in the limestone groundwater at PBOW (Shaw, 2006), and was found to be prevalent in bedrock groundwater underlying the adjacent LBA site (Shaw, 2011b). As described in Section 3.1.1.2, petroleum hydrocarbon staining was observed at depth during the drilling of all three WWTP1 wells, and WTP1-BEDGW-001 had petroleum hydrocarbon seeping from factures at 68.4 to 68.5 and 74.0 to 74.4 feet bgs. Note that WTP1-BEDGW-001 was dry and no samples could be collected from this well. Also, hydrogen sulfide odor was observed in WTP1-BEDGW-003 (greater than 200 ppm) during well purging. Hydrogen sulfide has also been observed at high concentrations in bedrock wells at nearby PBOW sites, notably in AP1 well AP1-BEDGW-002 (Shaw, 2010) and in LBA monitoring well MNTA-BEDGW-001 (more than 200 ppm) (Shaw, 2011b). Also, in nearby AP1 well AP1-BEDGW-001 to the south (generally upgradient), approximately 1 to 2 feet of free product has been found on the surface of the water during sampling (Shaw, 2010a). Petroleum hydrocarbons were also found at depth in four of the six bedrock wells in the LBA (Shaw, 2011b) to the west, indicating the prevalence of petroleum contamination in the bedrock zone within this general area of PBOW. These observations

provide evidence that petroleum hydrocarbons and elevated levels of hydrogen sulfide are naturally occurring in this general area of PBOW.

Arsenic was detected at a concentration of 129 µg/L in the sample collected from bedrock monitoring well WWTP1-BEDMW-001 in May 2009, but was not detected in the sample collected from this well in November 2009. Arsenic was also detected in the only sample that could be collected from WWTP1-BEDGW-002 (23.1 µg/L), using a bailer because of low yield; this well could not be sampled in November 2009 because of insufficient water yield. It is noted that the sample collected from AP1-BEDMW-001 in May was sampled using low-flow methodology, but the sample collected in November 2009 had to be collected via bailer because of insufficient water yield for low-flow methodology.

The low yield for the WWTP1 and nearby LBA and AP1 bedrock monitoring wells, as well as the presence of naturally occurring petroleum, indicates that potable use by a site worker is not a plausible exposure pathway. In addition, the arsenic present in the WWTP1 bedrock groundwater appears to be unrelated to PBOW activities based on the following observations:

- Arsenic was detected at background concentrations in the overlying WWTP1 soil samples. The MDC (10.8 mg/kg) and mean concentration (3.8 mg/kg) of arsenic in total soil are both less than those of PBOW background data set (36.5 and 10.1 mg/kg, respectively).
- Arsenic was detected at an MDC of only 7.7 µg/L in the overlying overburden groundwater wells, which is consistent with the BSC for bedrock groundwater. Note that arsenic was not detected in either of the two WTP1-03 samples, which is the overburden location that is nested with the bedrock well in which the MDC for arsenic was reported.
- Arsenic is not a component of any waste stream related to TNT manufacturing.

The ILCR for the future groundskeeper without the contributions of groundwater is 3E-6 (Table 5-2), which is within the NCP cancer risk management range and less than the 1E-5 PBOW cancer risk goal.

The total HI for the future groundskeeper (Table 5-1) is 6. This exceeds the target HI value of 1, which would seem to indicate that noncancer health effects cannot be regarded as unlikely to occur. Virtually all this HI is associated with the hypothetical use of bedrock groundwater, which alone represents an HI of 6. As discussed previously for cancer risk to the future groundskeeper, WWTP1 groundwater is not present in sufficient quantity for use. Also, note that approximately 90 percent of this HI value is associated with benzene (HQ=1.1) and arsenic (HQ=4.2) in

groundwater. As stated previously, benzene is not associated with former PBOW operations but is associated with naturally occurring petroleum. As discussed previously for cancer effects, arsenic approximated background concentrations in WWTP1 overburden groundwater, and WWTP1 soil concentrations were within background levels.

If the contributions of groundwater pathways are appropriately excluded for this receptor based on low water yield and naturally poor groundwater quality, the resulting HI for this receptor is 0.08 (Table 5-2). This is less than the target HI criterion of 1, indicating that this receptor is unlikely to encounter adverse noncancer health effects.

Overburden Groundwater Use. The total ILCR for the future groundskeeper, assuming hypothetical use of overburden groundwater, is 4E-5 (Table 5-1). This value is within the NCP risk management range but exceeds the PBOW target cancer risk goal of 1E-5. Virtually all of this value is associated with exposure to overburden groundwater, and approximately 86 percent of this value is associated with exposure to arsenic (ILCR=3.6E-5) in groundwater.

Arsenic was detected in two of the six overburden groundwater samples, and the MDC (7.7 µg/L) approximates the MDC of the background data set (7.4 µg/L). Note also that both of these detections were in the October 2009 samples for WTP1-MW01 and WTP-MW02; arsenic was not detected in the May 2009 samples from these two wells. As mentioned in the discussion of bedrock groundwater, the MDC and mean concentrations of arsenic in soil are less than those of the PBOW background soil data set. Based on the lack of elevated arsenic concentrations in soil, overburden groundwater concentrations of arsenic that are consistent with those of background groundwater, and the knowledge that arsenic is not a component of any known waste stream, the presence of arsenic in overburden groundwater does not appear to be related to any former site operations.

Of the three overburden monitoring wells, low-flow sampling could only be used at WTP1-MW01; wells WTP1-MW02 and WTP1-MW03 were not low-flow sampled because of insufficient water yield. This is similar to the results of nearby sites AP1 (Shaw, 2010) and the LBA (Shaw, 2011b), where most of the overburden wells produced insufficient water for low-flow sampling. WWTP1 overburden groundwater is thus interpreted as having insufficient production for use as tap water. Therefore, inclusion of the groundwater use pathway exaggerates exposure to this receptor.

If groundwater use is appropriately excluded for this receptor, then the resulting ILCR is 3E-6 (Table 5-2). This is within the NCP risk management range and is less than the PBOW cancer risk goal.

The total HI for the future groundskeeper, assuming hypothetical use of overburden groundwater, is 0.4 (Table 5-1). This is less than the target HI criterion of 1, indicating that noncancer health effects are regarded as unlikely to occur under this scenario. If groundwater exposure pathways are appropriately excluded for this receptor because of low groundwater yield as described previously, the HI (0.08) is even lower.

5.3.3 Indoor Worker

The exposure assumptions for the future indoor worker include direct contact with surface soil, inhalation of volatiles from subsurface soil, and direct exposure to groundwater via direct contact (ingestion and dermal exposure). The risk characterization was run separately for bedrock groundwater exposure and overburden (well) groundwater exposure.

Bedrock Groundwater Use. The total ILCR for the future indoor worker, assuming hypothetical bedrock groundwater use, is 8E-4 (Table 5-1). This value exceeds both the NCP risk management range and the PBOW target cancer risk goal of 1E-5. Over 99 percent of this ILCR is associated with benzene (8.3E-5) and arsenic (6.8E-4) in groundwater. As described in Section 5.3.2, benzene is a petroleum constituent that is known to be naturally occurring in the limestone groundwater at PBOW (Shaw, 2006), and petroleum was reported seeping at depth in all three of the WWTP1 bedrock wells and in a number of the nearby AP1 and LBA bedrock wells. Also, as discussed in Section 5.3.2, the presence of elevated arsenic in WWTP1 bedrock groundwater does not appear to be related to former site activities, and the bedrock groundwater underlying WWTP1 would not yield sufficient volume for tap water use.

The ILCR for the future indoor worker is 5E-7 if the contribution of bedrock groundwater is appropriately excluded (Table 5-2). This value is less than the NCP risk management range and the PBOW 1E-5 cancer risk goal.

The total HI for the future indoor worker (Table 5-1) is 6. This exceeds the target HI value of 1, which would seem to indicate that noncancer health effects cannot be regarded as unlikely to occur. Virtually all of this HI is associated with the hypothetical use of bedrock groundwater. As discussed in Section 5.3.2 for the future groundskeeper, WWTP1 groundwater is not present in quantities sufficient for use. Also, approximately 90 percent of this HI value is associated with benzene (HQ=1.1) and arsenic (HQ=4.2) in bedrock groundwater.

If the contributions of hypothetical bedrock groundwater are excluded because of low yield and naturally poor quality as described in Section 5.3.2, the resulting HI for the indoor worker is 0.03 (Table 5-2). This is far less than the target criterion of 1 and suggests that adverse noncancer health effects are unlikely.

Overburden Groundwater Use. The total ILCR for the future indoor worker, assuming hypothetical use of overburden groundwater, is 4E-5 (Table 5-1). This value is within the NCP risk management range but exceeds the PBOW target cancer risk criterion of 1E-5. Virtually all of this value is associated with exposure to overburden groundwater, and approximately 86 percent of this value is associated with exposure to arsenic (ILCR=3.6E-5) in groundwater. As described in Section 5.3.2, arsenic does not appear to be associated with former PBOW operations and is consistent with background groundwater levels. Further, Section 5.3.2 explains that the volume of water in the overburden unit underlying WWTP1 would not provide enough yield for tap water use.

If the contributions of hypothetical groundwater exposure pathways are appropriately excluded, the resulting ILCR for this receptor is 5E-7 (Table 5-2). This value is less than both the NCP risk management range and the PBOW cancer risk goal.

The total HI for the indoor worker is 0.4, assuming hypothetical use of overburden groundwater (Table 5-1). This is less than the target HI criterion of 1, indicating that noncancer health effects are regarded as unlikely to occur under this scenario. If groundwater exposure pathways are appropriately excluded for this receptor because of low groundwater yield as described above, the HI (0.03) is even lower (Table 5-2).

5.3.4 Construction Worker

The construction worker is assumed to be exposed to total soil through direct contact and via inhalation of suspended particulates, and to sediment and surface water via direct contact. The ILCR for the WWTP1 construction worker (Table 5-1) is estimated as 1E-7. This is less than both the 1E-6 to 1E-4 NCP risk management range and the PBOW cancer risk goal of 1E-5.

The total HI for the construction worker (Table 5-1) is 0.2. This is less than the target HI value of 1. Therefore, noncancer health effects are regarded as unlikely to occur.

5.3.5 Resident

The exposure assumptions for the resident include direct contact with total soil, inhalation of particulates from total soil, inhalation of volatiles from subsurface soil, direct exposure to sediment and surface water (ingestion and dermal exposure), and direct exposure with groundwater via direct contact (ingestion and dermal exposure). The risk characterization was run separately for bedrock groundwater exposure and overburden (well) groundwater exposure. The ILCR was calculated assuming exposure during a combined 30-year child/adult exposure duration, whereas separate noncancer HI values were calculated for the young child and adult life stages (Section 3.1.3.5). The results of each are described below.

Bedrock Groundwater Use. The total ILCR for the resident, assuming bedrock groundwater exposure, is 4E-3 (Table 5-1). This value exceeds both the NCP risk management range and the PBOW target cancer risk goal. Over 99 percent of this ILCR is associated with arsenic (2.9E-3), benzene (1.2E-3), and naphthalene (1.7E-4) in groundwater. As discussed in Section 5.3.2, the presence of elevated arsenic in WWTP1 bedrock groundwater does not appear to be related to former site activities. As described in Section 5.3.2, benzene is a petroleum constituent that is known to be naturally occurring in the limestone groundwater at PBOW (Shaw, 2006), and during well installation, petroleum was observed at all three WWTP1 wells and is present in nearby AP1 and LBA bedrock wells. Naphthalene is also a naturally occurring constituent in petroleum. Evidence that the naphthalene found in WWTP1 bedrock groundwater is not related to PBOW activities includes the following observations: 1) Naphthalene and other petroleum-related compounds were not detected in the overlying overburden groundwater, and 2) naphthalene was not identified as a soil COPC. Additionally, as discussed in Section 5.3.2, bedrock groundwater underlying the WWTP1 does not provide adequate yield for tap water use.

If the bedrock groundwater use is appropriately excluded, the ILCR for the resident is 8E-6 (Table 5-2). This value is within the NCP risk management range and is less than the PBOW 1E-5 cancer risk goal.

The total HI for the child resident, assuming bedrock groundwater exposure, is 74 (Table 5-1). This exceeds the target HI value of 1, indicating that noncancer health effects cannot be regarded as unlikely to occur. Virtually all of this HI value is associated with exposure to bedrock groundwater, and approximately 93 percent of the groundwater HI value is associated with benzene (HQ=22), arsenic (HQ=28), naphthalene (HQ=7), and xylenes (HQ=12). The non-site-relatedness of arsenic, benzene, and naphthalene are discussed above with respect to cancer risks. Similar to benzene and naphthalene, xylenes are a component of naturally occurring petroleum.

Xylenes appear to be unrelated to former PBOW activities based on the observation that xylenes were not detected in the overlying overburden unit or in WWTP1 soil.

As discussed in Section 5.3.2, bedrock groundwater underlying WWTP1 does not provide adequate yield for potable use. Therefore, if the contribution of bedrock groundwater is appropriately excluded, the resultant HI for the child resident is 0.8 (Table 5-2). This is less than the target HI, indicating that adverse noncancer health effects are unlikely to result from exposure by the child resident receptor to WWTP1 total soil, sediment, and surface water.

The total HI for the adult resident, assuming bedrock groundwater exposure, is 32 (Table 5-1). This exceeds the target HI value of 1, indicating that noncancer health effects cannot be regarded as unlikely to occur. Similar to the child resident discussed above, virtually all of this HI is associated with exposure to bedrock groundwater, and approximately 93 percent of the groundwater HI value is associated with benzene (HQ=9), arsenic (HQ=12), naphthalene (HQ=3), and xylenes (HQ=5). The non-site-relatedness of these four compounds is discussed for the child resident in the preceding paragraphs. Also, as discussed above, bedrock groundwater underlying WWTP1 provides insufficient yield to consider as a source of residential groundwater. Therefore, the contribution of bedrock groundwater may be appropriately excluded.

If the contributions of groundwater are excluded, resultant HI for the adult resident is 0.09 (Table 5-2). This is less than the target HI, indicating that adverse noncancer health effects are unlikely to result from exposure by the adult resident receptor to WWTP1 total soil, sediment, and surface water.

Overburden Groundwater Use. The total ILCR for the future resident, assuming overburden groundwater exposure, is 2E-4 (Table 5-1). This value exceeds both the NCP risk management range and the PBOW target cancer risk goal. Over 95 percent of this value is associated with exposure to overburden groundwater, and over 80 percent of this value is associated with exposure to arsenic (ILCR=2.5E-5) in groundwater. As described in Section 5.3.2, arsenic does not appear to be associated with former PBOW operations and is consistent with background groundwater levels. Further, Section 5.3.2 explains that the volume of water in the overburden unit underlying WWTP1 would not provide enough yield for tap water use.

If the contributions of hypothetical groundwater exposure pathways are appropriately excluded, the resulting ILCR for this receptor is 8E-6 (Table 5-2). This value is less than the NCP risk management range and equals the PBOW cancer risk goal.

The total HI for the child resident, assuming overburden groundwater exposure, is 3 (Table 5-1). This exceeds the target HI value of 1, which would seem to indicate that noncancer health effects cannot be regarded as unlikely to occur. Approximately 77 percent of this HI is associated with exposure to overburden groundwater, and approximately 50 percent of this HI is associated with arsenic in groundwater (HI=1.5). As described in Section 5.3.2, arsenic concentrations in overburden groundwater are consistent with background concentrations, and arsenic does not appear to be related to former PBOW activities. Further, overburden groundwater would not provide adequate yield for tap water use.

If the groundwater pathway is appropriately excluded based on non-site relatedness and insufficient groundwater yield, then the total HI for the child resident exposed to WWTP1 total soil, sediment, and surface water is 0.7 (Table 5-2). This value is less than the target HI criterion of 1, indicating that adverse noncancer health effects are unlikely.

The total HI for the adult resident, assuming overburden groundwater exposure, is 1 (Table 5-1). This equals the target HI value of 1, which indicates that noncancer health effects are regarded as unlikely to occur. As discussed for the child resident, the contribution of the groundwater exposure may be appropriately excluded. The resultant total HI for the adult resident exposed to WWTP1 total soil, sediment, and surface water is even lower at 0.09 (Table 5-2), which is less than the target HI criterion of 1.

5.3.6 Adult Hunter

The ILCR for the adult hunter (Table 5-1) exposed to surface soil both through direct contact and via the ingestion of venison is estimated as 1E-7. This is less than the 1E-6 to 1E-4 NCP risk management range and less than the PBOW cancer risk goal of 1E-5.

The total HI for the adult hunter is (Table 5-1) is 0.004. This is far less than the target HI value of 1, indicating that noncancer health effects are unlikely to occur.

5.3.7 Hunter's Child

The ILCR for the hunter's child (Table 5-1) exposed to surface soil via the ingestion of venison from deer which grazed on site is estimated as 2E-11. This is less than both the 1E-6 to 1E-4 NCP risk management range and the PBOW cancer risk goal of 1E-5.

The total HI for the hunter's child (Table 5-1) is estimated as 0.000006. This value is far less than the target HI criterion of 1 and indicates that noncancer health effects are unlikely to occur.

6.0 Uncertainty Analysis

The primary objective of the BHHRA is to characterize and quantify potential human health risks. However, these risks are estimated using incomplete and imperfect information that introduces uncertainties at various stages of the risk assessment process. Uncertainties associated with earlier stages of the risk assessment become magnified when they are linked with other uncertainties in the latter stages. Reliance on a simplified numerical presentation of dose rate and risk without consideration of uncertainties, limitations, and assumptions inherent in their derivation can be misleading. For example, the calculated ILCR for a given scenario "A" may be 1E-5 (meets the PBOW risk goal) and that of scenario "B" may be 5E-5 (exceeds the PBOW risk goal). However, if the uncertainties associated with scenario "B," for instance, span orders of magnitude and the ILCR is regarded as biased high, it is not unlikely that scenario "A" actually presents a higher risk of developing cancer.

The chief goal of this analysis is to evaluate uncertainties and present them in context of their potential impact on the interpretation of the risk assessment results and the types of environmental management decisions that may be based on these results. The uncertainty analysis does not exhaustively describe all potential uncertainties but presents those that have the largest implications for the interpretation of the risk assessment results. This analysis also summarizes the types and, as applicable, the magnitude of the uncertainties at each stage of the risk assessment. Although the discussion in the following sections includes generic uncertainties that are common to the state of human health risk assessment practice overall (e.g., additivity of health effects in the risk characterization), the uncertainty analysis focuses on the sets of uncertainties that are specific to WWTP1.

6.1 Types of Uncertainty

Uncertainties in risk assessment are categorized into two general types: 1) variability inherent in the (true) heterogeneity of the data set, measurement precision, and measurement accuracy; and 2) uncertainty that arises from data gaps. Estimates of the degree of variability tend to decrease as the sample size increases. This is because larger data sets are less impacted by individual samples/measurements and typically allow for greater accuracy. Uncertainty that arises from data gaps is addressed by applying models and assumptions. Models are applied because they represent a level of understanding to address certain exposure parameters that are impractical or impossible to measure (e.g., COPC concentrations in air that would result from groundwater use that has not yet occurred—or may never occur—at the site). Assumptions represent an educated estimate to address information that is not available (e.g., additivity of carcinogens).

6.2 Sources of Uncertainty

The discussion in the following subsections provides an overview of uncertainty, with a focus on those sources that are most likely to affect interpretation of the risk assessment results.

6.2.1 Sample Selection

Soil samples were collected from within the former WWTP1, where TNT manufacturing process waste water was treated. The well locations were selected from within and adjacent to WWTP1, including downgradient areas. A single surface water and four sediment samples were collected within the two drainage ditches at WWTP1 that had potentially been impacted by WWTP1 materials. Only three samples could be collected in two rounds of sampling from the two WWTP1 bedrock well locations. No well could be installed at the third location, WTP1-BEDGW-001, because no water was present in the borehole. Even though only three bedrock groundwater samples were collected, more samples from this medium would not seem imperative due to its general scarcity and corresponding lack of exposure pathway. The same can be said for surface water, as it is typically not present in the WWTP1 ditches; thus, exposure to this medium would be very minimal.

The LSI sampling location PBOW99-SSW108 should be noted. As described in Section 2.2, a TNT concentration of 170,000 mg/kg was reported in the duplicate of the original sample; only 0.6 mg/kg was reported in the original sample. Because of the extremely high level reported in the duplicate, four additional samples were collected at/near this same sampling location in November 2010 to determine whether the unusual duplicate results were indicative of a “hot spot” or were errant. Sample SSW-108-R was collected from the same coordinates as PBOWSSW108, and SSW-108-NE, SSW-108-NW, and SSW-108-S were all collected 5 feet from the original location. The TNT concentrations in these samples ranged from 0.352 mg/kg (SSW-108-R) to 49.9 mg/kg (SSW-108-NW). The nitroaromatics results from the four 2010 samples were averaged as replicates to represent this location, as none of these samples—nor the original LSI sample—suggested the presence of a hot spot. In summary, the sample selection appears appropriate for this evaluation.

6.2.2 Screening of COPCs in Surface Water and Sediment

As explained in Section 2.4.1, the method for screening COPCs in the PBOW BHHRA protocol differs somewhat from the current OEPA method. Had the current OEPA method been used to screen surface water and sediment, two additional analytes, iron and manganese, would have been identified as COPCs for surface water and no additional analytes would have been identified as COPCs for sediment. Neither iron nor manganese is related to former site activities.

The inclusion of these analytes as COPCs would have made a negligible difference to the noncancer HI values for the relevant receptors (i.e., construction worker and resident).

6.2.3 Exposure-Point Concentration Estimates

Uncertainty is introduced in the statistical approach used to calculate the EPCs. As stated in the HHEM (EPA, 1989a), the average concentration of the site should be used as the concentration term. Generally, a UCL is used to account for the uncertainty of using a sample data set to estimate the true population mean concentration for the site. ProUCL Version 4.00.05 software (EPA, 2010a) was used to calculate the EPCs for those media with five or more samples. However, as is readily observed by reviewing the ProUCL output (Appendix B), the calculation of the UCL can vary with methodology. It is unclear as to whether the UCL value of a specific EPC would result in an underestimate or overestimate of the true population mean. However, the general use of a UCL on all the data sets, even given the uncertainty as to whether a given method provides full coverage at 95 percent confidence, would result in general overestimation of the population mean and associated risks. Therefore, as intended by the guidance (EPA, 1989a), this practice of using the UCL as the EPC (note that the MDC is used as the EPC if the UCL exceeds the MDC) introduces bias that tends to overestimate the population mean and the resultant risk values.

WWTP1 bedrock groundwater, sediment, surface water, and sediment data sets have fewer than five samples. Thus, the MDC was used as the EPC for these data sets. Use of the MDC likely introduces a high bias to the risk values.

6.2.4 Land-Use Assumptions/Receptor Selection

The current groundskeeper is intended to represent an on-site worker under the current land use as NASA-controlled property. Because there is currently no identified NASA activity other than occasional mowing in the eastern portion of the site and along Maintenance Road, the use of this receptor likely overestimates risks and hazards to a current site worker. The assumed future use of the hunter and the hunter's child are reasonable, as other areas within PBOW may currently be legally hunted by permit.

Unrestricted land use, including residential use, is a reasonable assumption for the future WWTP1, given the rural residential use of property adjacent to the PBOW facility. The assumption that either the overburden or bedrock groundwater will be used as a potable water source in the future is regarded as implausible for reasons described in Section 6.2.5.

6.2.5 Groundwater Use

The use of WWTP1 bedrock groundwater is regarded as unlikely because it contains natural petroleum and hydrogen sulfide, which can be commonly observed in area quarries (Shaw, 2005). As described in Section 3.1.1.2, petroleum hydrocarbon staining was observed at depth during the drilling of all three WWTP1 wells, and WTP1-BEDGW-001 had petroleum hydrocarbon seeping from factures at 68.4 to 68.5 and 74.0 to 74.4 feet bgs. Note that WTP1-BEDGW-001 was dry and no samples could be collected from this well. Also, hydrogen sulfide odor was observed in WTP1-BEDGW-003 (greater than 200 ppm) during well purging. Hydrogen sulfide has also been observed at high concentrations in bedrock wells at nearby PBOW sites, notably in AP1 well AP1-BEDGW-002 and in LBA monitoring well MNTA-BEDGW-001 (more than 200 ppm) (Shaw, 2011b). Also, in nearby AP1 well AP1-BEDGW-001 to the south (generally upgradient), approximately 1 to 2 feet of free product has been found on the surface of the water during sampling (Shaw, 2010). Petroleum hydrocarbons were also found at depth in four of the six bedrock wells in the LBA (Shaw, 2011b) to the west, indicating the prevalence of petroleum contamination in the bedrock zone within this general area of PBOW. These observations provide evidence that petroleum hydrocarbons and elevated levels of hydrogen sulfide are naturally occurring in this general area of PBOW.

The WWTP1 overburden groundwater has been found to be of low yield, and the overburden groundwater is regionally and seasonally discontinuous throughout much of PBOW (Shaw, 2006). This discontinuity also appears to be true of WWTP1. Of the three WWTP1 overburden groundwater monitoring wells, only WWTP1-MW01 could be sampled using low-flow sampling. Note that potable wells need to provide a flow rate that is orders of magnitude greater.

In summary, use of the bedrock groundwater and overburden groundwater as a potable source at WWTP1 is regarded as implausible for the following reasons: 1) Both bedrock and overburden groundwater yield water volumes that are clearly inadequate; 2) bedrock groundwater has naturally occurring petroleum and hydrogen sulfide constituents that make the water unsuitable for potable or industrial use, regardless of yield; 3) this poor bedrock quality is associated with the presence of hydrogen sulfide off-gassing, a concern with respect to nuisance odors and potential health issues; 4) no residential wells in the area have been identified as potable; and 5) municipal water is available in the area.

6.2.6 Exposure Assumption Values

The exposure assumption values used in the exposure assessment (Table 3-1) are selected to represent either an upper bound (e.g., 95th percentile) or mid-range value, depending on the particular parameter. Mathematically combining these terms in exposure equations is generally

thought to result in decidedly conservative exposure estimations (Cogliano, 1997; Burmaster and Harris, 1993). In general, this conservativeness is associated with the state of risk assessment practice, which attempts to focus on the upper end of exposure possibilities rather than more realistic levels of exposure, and not on assumptions made specifically for WWTP1.

6.2.7 Groundwater-to-Air Household Model

The groundwater-to-air household model (EPA, 1991b) has considerable associated uncertainties. Some parameters that affect the model include the air exchange rate of the house (which can vary with the season) level of groundwater usage, and size of the house. EPA (1991b) states that the model assumes a four-member household that uses 720 L/day of water, a home with a volume of 150 m^3, and 0.25 household air exchanges per hour. The *Exposure Factors Handbook* (EPA, 1997a) lists the following information for the average four-person home: household use of 892 L/day (4 × 223 L/day), volume of 431 m^3, and air exchange rate of 0.63 volumes per hour. If the values from the *Exposure Factors Handbook* were used instead of the default values from EPA (1991b), the resultant estimated household air concentrations would be less than those estimated in the BHHRA by a factor of nearly 5. In summary, the selection of the groundwater-to-air model parameter values used by EPA (1991b) may contribute a conservative bias to the resultant risk estimates.

6.2.8 Toxicity Assessment

Uncertainties associated with the toxicity assessment include those regarding development of the health effects criteria values, the classification of potential carcinogenicity, the extrapolation of exposure route-specific toxicity values to other routes of exposure, and the extrapolation of toxic effects observed in animal studies to potential adverse effects in humans. A general summary of these uncertainties is provided in the following paragraphs.

The development of health effects criteria for noncancer effects involves considerable professional judgment. An uncertainty factor of up to 10 may be applied to a toxicologically identified benchmark dose or concentration to address the unknown regarding each of the following (EPA, 1989b): lowest-observed-adverse-effects level to no-observed-adverse-effects level, subchronic-to-chronic extrapolation, route-to-route extrapolation, and species-to-species extrapolation. A “modifying factor” of 10 or less is likewise applied in the development of RfDs and RfC, using professional judgment. This modifying factor is intended to address gaps in the database and the steepness of the dose-response curve. In practice, the overall UF, derived by multiplying the individual uncertainty factors by the modifying factor, associated with RfD and RfC values may span up to four orders of magnitude.

The EPA weight-of-evidence classification system for carcinogens is used to examine and classify chemical agents with respect to their carcinogenic potential. Most EPA potential carcinogens are classified based on animal data, without sufficient human data to support a causal association (i.e., former Group B2; refer to Section 4.1). Also, the linearized multistage (LMS) mathematical model was used to extrapolate values from relatively high-dose rodent studies to relatively low-dose human exposures in the development of SFs for these compounds. This application of the LMS model is the subject of much controversy. Thus, the LMS approach used to develop SFs, combined with other assumptions, tends to overestimate potential risks.

Overall, the toxicity values, assuming similar effects between humans and test species, tend to result in overestimates of noncancer hazards or cancer risks. However, it is possible that a given chemical can elicit a toxic response in humans that is not observed in the laboratory species studied or that humans may be more sensitive to a given chemical. In this instance, it is possible for the use of the toxicity values to result in underestimates of risks/hazards.

6.2.9 Risk Characterization

It is assumed that the effects of simultaneous exposures to multiple carcinogens at a site are additive. Likewise, it is assumed that noncancer effects of contaminants are additive if they have a similar mechanism of toxicity. In risk assessment practice, it is assumed that the effects of chemicals that affect the same target organ are additive unless chemical-specific information would dictate otherwise. However, chemicals in combination may act additively, synergistically, or antagonistically or may not influence one another at all. Therefore, depending on the interactive effects (if any), the risk characterization approach to multiple contaminants may lead to either underestimates or overestimates of potential risk/hazard.

6.2.10 Evaluation of Selected COPCs for Site Relatedness

As described in Section 2.4.3, a comparison of naturally occurring metals is performed in two steps. The first is a comparison to BSCs; a chemical whose MDC does not exceed the BSC is assumed to be related to background and thus eliminated from further evaluation. The second step is performed for selected metals and organic compounds during the risk characterization step, after exposure calculations are performed which include the potential background-related contributions as part of the overall ILCR and HI results.

For inorganics in soil or bedrock groundwater, the risk characterization background evaluation step typically may include a statistical comparison of the site data set to the background data set using the WRS statistical test as appropriate (Section 2.4.3.2). Note that no suitable background

data sets exist for overburden groundwater, sediment, or surface water. Also, the bedrock groundwater data set for WWTP1 was too small (n=3) for statistical testing.

Vanadium was the only inorganic COPC identified for WWTP1 soil, and it was identified as a COPC in both surface and total soil. Even though vanadium did not contribute significantly to WWTP1 risks or hazard, a WRS statistical test was conducted for vanadium in surface soil and total soil. The WRS output and box-and-whisker plots are provided in Appendix F. The WRS results for surface soil (p=0.69) and total soil (p=0.65) indicate that vanadium results are not significantly different than those found in PBOW background; therefore, these vanadium concentrations are considered to be unrelated to former site operations. This is consistent with the observation that vanadium was not a chemical of concern in any of the TNT manufacturing sites, and vanadium is not part of the TNT waste stream formerly treated at WWTP1.

A qualitative background evaluation was performed for petroleum-related organic compounds observed in WWTP1 bedrock groundwater, most notably BTEX compounds and naphthalene. These compounds are petroleum constituents that are known to be naturally occurring in the limestone groundwater at PBOW (Shaw, 2006). Petroleum was reported seeping at depth in well location WTP1-BEDGW-001, and petroleum staining was found in WWTP1 wells WTP1-BEDGW-002 and WTP1-BEDGW-003. Petroleum was also found in most of the bedrock monitoring wells from the nearby LBA and AP1 sites (Section 5.3.2). Based on the observation of petroleum in the rock cores during drilling and the known regional presence of petroleum associated with the limestone bedrock, the observed elevated concentrations of the BTEX compounds and naphthalene that drive risks/hazards to a hypothetical bedrock groundwater user are not regarded as related to former PBOW activities.

The noncancer hazards and cancer risks associated with overburden groundwater use are driven by the presence of arsenic. Arsenic also contributed to the cancer risks and noncancer hazards in bedrock groundwater. Although a statistical test to compare arsenic in overburden groundwater to that of background was not performed because no background data set exists specifically for the overburden groundwater, a qualitative comparison reveals that the concentrations of the two detections of arsenic (7.2 and 7.7 µg/L) in overburden groundwater approximate the BSC for arsenic in bedrock groundwater (7.4 µg/L). Because the concentrations of arsenic in the overlying soil are well within background levels, the arsenic in groundwater does not appear to have originated from surface spills or leaks. Moreover, arsenic was not identified as being part of a TNT manufacturing waste stream. These observations together indicate that the arsenic concentrations in overburden groundwater are not associated with former WWTP1 activities. Arsenic was detected at an elevated concentration in one sample from bedrock well WTP1-

BEDGW-001(129 µg/L), but was not detected in the other sample from this well. The arsenic concentrations in WWTP1 bedrock groundwater are unlikely to be related to former PBOW operations because arsenic was not detected at elevated concentrations in the overlying soil or overburden groundwater, and arsenic was not part of the TNT manufacturing waste stream.

7.0 Summary and Conclusions

7.1 Summary

The BHHRA was conducted to evaluate cancer risk and noncancer hazards associated with WWTP1 surface soil, subsurface soil, surface water, sediment, bedrock groundwater, and overburden groundwater. A risk-based screening approach was used to identify COPCs and focus the risk assessment on those chemicals detected at WWTP1 that may contribute appreciably to risk or hazard. The sampled media were screened against the respective RBSCs, and inorganics in bedrock groundwater and soil were also screened against BSCs. COPCs for the various media were identified based on this screening. Exposure and risk/hazard associated with the COPCs were evaluated using the following receptors (media evaluated in parentheses):

- Current groundskeeper (surface soil)
- Future groundskeeper (total soil, groundwater)
- Future indoor worker (surface soil, subsurface soil [inhalation pathway only], groundwater)
- Current/future construction worker (total soil, surface water, sediment)
- Future resident (total soil, surface water, sediment, overburden groundwater, bedrock groundwater)
- Future adult hunter (surface soil, including venison pathway)
- Future hunter's child (surface soil [venison pathway only]).

Each receptor scenario that includes groundwater was run separately for overburden groundwater and bedrock groundwater. Because groundwater yield was found to be insufficient for potable use in the overburden and bedrock units underlying WWTP1, and the WWTP1 bedrock groundwater was observed to be of naturally poor quality due to the presence of petroleum and hydrogen sulfide, the receptors evaluated for potable groundwater use were also evaluated assuming no groundwater use. The resident was evaluated for noncancer hazards separately for the young child (ages 1 through 6 years) and adult life stages.

The overall HI and ILCR values are summarized in the following bullets; exceedances of the PBOW cancer risk goal (ILCR>1E-5) are shown as bolded and exceedances of the noncancer hazard criterion (HI>1) or the NCP risk management range (1E-6 to 1E-4) are shown as bold italics:

- Current groundskeeper: ILCR = 2E-6; HI = 0.08
- Future groundskeeper – all pathways, assuming bedrock groundwater use: ***ILCR = 8E-4; HI = 6***
- Future groundskeeper – all pathways, assuming overburden groundwater use: **ILCR = 4E-5**; HI = 0.4
- Future groundskeeper – all pathways, excluding groundwater use: ILCR = 3E-6; HI = 0.07
- Indoor worker – all pathways, assuming bedrock groundwater use: **ILCR = 8E-4; *HI = 6***
- Indoor worker – all pathways, assuming overburden groundwater use: ***ILCR = 4E-5***; HI = 0.4
- Future indoor worker – all pathways, excluding groundwater use: ILCR = 5E-7; HI = 0.03
- Construction worker: ILCR = 1E-7; HI = 0.2
- Resident – all pathways, assuming bedrock groundwater use: ***ILCR = 4E-3***; ***child HI = 74***; ***adult HI = 32***
- Resident – all pathways, assuming overburden groundwater use: ***ILCR = 2E-4***; ***child HI = 3***;
  adult HI = 1
- Resident – all pathways, excluding groundwater use: ILCR = 8E-6; child HI = 0.8; adult HI = 0.09
- Hunter: ILCR = 1E-7; HI = 0.004
- Hunter's child: ILCR = 2E-11; HI = 0.000006.

7.2 Conclusions

The ILCR and HI values for the two current exposure scenarios (current groundskeeper and construction worker) each meet the PBOW cancer risk goal (ILCR$\leq$1E-5) and the noncancer hazard criterion (HI$\leq$1). Note that no groundskeeping appears to have occurred at WWTP1 in recent years, except occasional mowing in the far eastern part of the site and more regular mowing along Maintenance Road. Thus, the current groundskeeper scenario, which assumes a full-time, 25-year employee who works exclusively at WWTP1 for 8 hours per day, 250 days per year, appears to greatly overestimate the exposure levels of any current on-site worker or other current receptor. Note that no construction is currently planned at WWTP1.

Each of the potential future exposure scenarios that does not assume potable use of groundwater also meets the PBOW risk goal and hazard criterion.

The cancer risks associated with the following future receptors assumed to use bedrock groundwater as a hypothetical source of tap water exceed the NCP risk management range and PBOW cancer risk goal: future groundskeeper, future indoor worker, and future resident. Each of these also exceeds the target HI criterion of 1. The ILCR for each of these under the assumption of overburden groundwater use also exceeds the PBOW cancer risk goal, but only the resident exceeds the NCP risk management range. Of all the receptors that are assumed to use overburden groundwater, only the child resident exceeds the HI criterion.

The cancer risks and cancer hazards associated with bedrock groundwater are nearly entirely attributable to natural petroleum-related BTEX compounds and arsenic, which also do not appear to be related to former site activities. The noncancer hazards associated with overburden groundwater are mostly due to arsenic which does not appear to be associated with former site activities. Use of either the overburden or bedrock groundwater is regarded as implausible because of insufficient yield. Additionally, the naturally poor quality of the bedrock groundwater and associated hydrogen sulfide off-gassing make it unsuitable as a potable source. The readily available municipal water supply obviates the need for use of groundwater as a potential source of tap water in the general vicinity of PBOW.

If the contributions of exposure to groundwater are appropriately excluded, none of the WWTP1 receptors had ILCRs or HIs that exceed the PBOW goals or the NCP risk management range. This indicates that the associated environmental media at WWTP1 are unlikely to pose an unacceptable cancer risk to any receptor and that exposure to these media is unlikely to result in adverse noncancer health effects for any human receptor. Because groundwater use is not regarded as plausible based on insufficient yield in both the overburden and bedrock units, the risks associated with WWTP1 groundwater are accordingly implausible. The naturally poor quality in the WWTP1 bedrock groundwater further supports the implausibility of bedrock groundwater use.

8.0 References

Burmaster, D.E., and R.H. Harris, 1993, "The Magnitude of Compounding Conservatisms in Superfund Risk Assessment," ***Risk Analysis, 13(2): 131-134***.

California Environmental Protection Agency, 2011, ***Toxicity Criteria Database***, Office of Environmental Health Hazard Assessment, Sacramento, California, http://www.oehha.ca.gov/risk/ChemicalDB/index.asp.

City-Data.com, 2004, on-line data search for Sandusky, Ohio, performed November 11, 2004, http://www.city-data.com/city/Sandusky-South-Ohio.html.

Cogliano, V.J., 1997, "Plausible Upper Bounds: Are Their Sums Plausible?" ***Risk Analysis***, 17(1): 77-84.

Dames and Moore, Inc. (D&M), 1997, ***TNT Areas Site Investigation Final Report for Plum Brook Ordnance Works, Plum Brook Station/NASA, Sandusky, Ohio***, prepared for U.S. Army Corps of Engineers, Nashville District/Huntington District, April.

Dames and Moore, Inc. (D&M), 1996, ***Red Water Ponds Focused Remedial Investigation, Draft Report, Plum Brook Ordnance Works, Sandusky, Ohio***, May.

Dames and Moore, Inc. (D&M), 1995, ***Draft Records Review Report, Plum Brook Ordnance Works, Sandusky, Ohio,*** April 27.

Environmental Council of the States-U.S. Department of Defense, 2007, ***Identification and Selection of Toxicity Values/Criteria for CERCLA and Hazardous Waste Site Risk Assessments in the Absence of IRIS Values,*** ECO-DOD Sustainability Work Group, Emerging Contaminants Task Group, Risk Assessment Provisional Values Subgroup Issue Paper, 23 April.

International Consultants Incorporated (ICI), 1995, ***Site Management Plan, Plum Brook Ordnance Works, Sandusky, Ohio, Part B, Areas of Concern***, September.

IT Corporation (IT), 2001a, ***TNT Areas A and C Remedial Investigation, Volume II – Human Health Risk Assessment, Final, Former Plum Book Ordnance Works, Sandusky, Ohio,*** November.

IT Corporation (IT), 2001b, ***TNT Areas A and C Remedial Investigation, Volume I – Report of Findings, Final, Former Plum Book Ordnance Works, Sandusky, Ohio,*** November.

IT Corporation (IT), 2000, ***Draft Baseline Human Health Risk Assessment Work Plan for the Former TNT Manufacturing Area, West Virginia Ordnance Works, Mason Count, West Virginia***, January.

IT Corporation (IT), 1999, ***Final - Summary Report, Site-Wide Groundwater Monitoring (1997-1998), Former Plum Brook Ordnance Works, Sandusky, Ohio,*** June.

IT Corporation (IT), 1998, ***Site Investigation of the Acid Areas, Former Plum Brook Ordnance Works, Sandusky, Ohio***, August.

IT Corporation (IT), 1997, ***Site-Wide Groundwater Investigation, Former Plum Brook Ordnance Works, Sandusky, Ohio***, September.

Mautz, W.W., H. Silver, and J.B. Holter, 1976, "Digestibility and Related Nutritional Data for Seven Northern Deer Browse Species," ***Journal of Wildlife Management***, 40(4): 630-638.

National Council on Radiation Protection and Measurements, 1984, ***Radiological Assessment: Predicting the Transport, Bioaccumulation, and Uptake by Man of Radionuclides Released to the Environment***, NCRP Report No. 76.

National Oceanic and Atmospheric Administration, 1990, ***Comparative Climatic Data for the United States through 1989***, National Climatic Data Center, Asheville, North Carolina.

Nutrient Database, 1997, Data compiled from U.S. Department of Agriculture releases, and published nutrient information from 71 chain references, on line, http://www.nutribase.com.

Ohio Environmental Protection Agency (OEPA), 2009a***, Use of U.S. EPA's Regional Screening Levels as Screening Values in Human Health Risk Assessments***, Technical Decision Compendium, Division of Emergency and Remedial Response, August.

Ohio Environmental Protection Agency (OEPA), 2009b***, Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for the DERR Remedial Response Program***, Technical Decision Compendium, Division of Emergency and Remedial Response, August.

Ohio Environmental Protection Agency (OEPA), 2009c, Email Correspondence from B. Buthker, OEPA Risk Assessor, to L. Long, USACE Risk Assessor, March 18.

Ohio Environmental Protection Agency (OEPA), 2004a, ***Subject: Background Calculation Methodology***, Division of Emergency and Remedial Response, June 30.

Ohio Environmental Protection Agency (OEPA), 2004b, e-mail correspondence from L. Moore (OEPA Risk Assessor) to L. Long (USACE Risk Assessor), December 15.

Ohio Environmental Protection Agency (OEPA), 1999, email correspondence between Lawrence Sirinek (OEPA Risk Assessor) and Paul Goetchius (Shaw Risk Assessor), March 5.

Sample, B.E. and Suter II, G.W., 1994, ***Estimating Exposure of Terrestrial Wildlife Contaminants***, Environmental Sciences Division, Oak Ridge National Laboratory, ES/ER/TM-125.

Sample, B.E., D.M. Opresko, and G.W. Suter II, 1996, ***Toxicological Benchmarks for Wildlife: 1996 Revision***, prepared for the U.S. Department of Energy by Health Sciences Research Division, Oak Ridge National Laboratory.

Science Applications International Corporation, 1991, ***Plum Brook Station Preliminary Assessment,*** June.

Sharp, G., 1995, Personal Communication: Telephone conversation between P. Goetchius, IT Corporation, and Gary Sharp, Wildlife Biologist, West Virginia Division of Natural Resources, Point Pleasant, West Virginia, 17 February.

Shaw Environmental, Inc. (Shaw), 2011a, ***Waste Water Treatment Plant 1, Site Characterization Report,*** Final Plum Brook Ordnance Works, Sandusky, Ohio, April.

Shaw Environmental, Inc. (Shaw), 2011b, ***Baseline Human Health Risk Assessment, Locomotive Building Area,*** Final, Plum Brook Ordnance Works, Sandusky, Ohio, September.

Shaw Environmental, Inc. (Shaw), 2011c, ***Screening Level Ecological Risk Assessment, Waste Water Treatment Plant 1, Draft, Plum Brook Ordnance Works, Sandusky, Ohio***, May.

Shaw Environmental, Inc. (Shaw), 2010, ***Baseline Human Health Risk Assessment, Ash Pit 1 and Ash Pit 3, Draft, Plum Brook Ordnance Works, Sandusky, Ohio***, December.

Shaw Environmental, Inc. (Shaw), 2009, ***Ash Pit 1 and Ash Pit 3, Baseline Human Health Risk Assessment and Screening Level Ecological Risk Assessment Work Plans, Final, Plum Brook Ordnance Works, Sandusky, Ohio***, August.

Shaw Environmental, Inc. (Shaw), 2008a, ***Final Phase 1 Remedial Investigation, Site-Specific Sampling and Analysis Plan and Site-Specific Safety and Health Plan, Waste Water Treatment Plants 1 and 3 and Ash Pits 1 and 3,*** *Plum Brook Ordnance Works, Sandusky, Ohio,* November.

Shaw Environmental, Inc. (Shaw), 2008b, ***Feasibility Study for Groundwater, TNT and Red Water Pond Areas, Final,*** *Former Plum Brook Ordnance Works, Sandusky, Ohio*, December.

Shaw Environmental, Inc. (Shaw), 2006, ***Baseline Human Health Risk Assessment of Groundwater, Former Plum Brook Ordnance Works, Sandusky, Ohio***, September.

Shaw Environmental, Inc. (Shaw), 2005, ***2004 Groundwater Data Summary and Evaluation Report, Final, Former Plum Brook Ordnance Works, Sandusky, Ohio***, April.

The Weather Channel, 2004, on-line data search for weather averages and records for Sandusky, Ohio, performed November 11, 2004, http://www.weather.com.

U.S. Army Corps of Engineers (USACE), 2000, ***Limited Site Investigation for the Former Plum Brook Ordnance Works, Waste Water Treatment Plants No. 1 and 3, Final Report***, July.

U.S. Army Corps of Engineers (USACE), 1999, ***Risk Assessment Handbook, Volume I: Human Health Evaluation***, Engineer Manual EM 200-1-4.

U.S. Department of Energy (DOE), 1989, ***A Manual for Implementing Residual Radioactive Material Guidelines***, Argonne National Laboratory, Argonne, Illinois, ANL/ES-160, DOE/CH/8901.

U.S. Department of Energy (DOE), 1983, ***Pathway Analysis and Radiation Dose Estimates for Radioactive Residues at Formerly Utilized MED/AEC Sites***, U.S. Dept. of Energy, Oak Ridge Operations Office, Oak Ridge, Tennessee, DOE ORO-832.

U.S. Environmental Protection Agency (EPA), 2011a, ***Drinking Water Contaminants***, online at http://water.epa.gov/drink/contaminants/index.cfm#List

U.S. Environmental Protection Agency (EPA), 2011b, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

U.S. Environmental Protection Agency (EPA), 2010a, ***ProUCL Version 4.00.05***, Office of Research and Development, Technology Support Center Characterization and Monitoring Branch, Las Vegas, Nevada, February, on line at http://www.epa.gov/esd/tsc/form.htm.

U.S. Environmental Protection Agency (EPA), 2010b, ***ProUCL Version 4.00.05 Technical Guide***, Draft, Office of Research and Development, Technology Support Center Characterization and Monitoring Branch, Las Vegas, Nevada, EPA/600/R-07/041, May.

U.S. Environmental Protection Agency (EPA), 2010c, ***ProUCL Version 4.00.05 User Guide***, Draft, Office of Research and Development, Technology Support Center Characterization and Monitoring Branch, Las Vegas, Nevada, April, EPA/600/R-07/038, May.

U.S. Environmental Protection Agency (EPA), 2010d, ***Regional Screening Level Table***, November, on line at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm.

U.S. Environmental Protection Agency (EPA), 2010e, ***Regional Screening Level Table, User's Guide (November 2010)***, on line at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.

U.S. Environmental Protection Agency (EPA), 2010f, ***Regional Screening Level Residential Soil Supporting Table***, November, on line at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm.

U.S. Environmental Protection Agency (EPA), 2005, ***Guidelines for Carcinogen Risk Assessment***, Risk Assessment Forum, Washington, D.C., March, EPA/630/P-03/001B.

U.S. Environmental Protection Agency (EPA), 2004a, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

U.S. Environmental Protection Agency (EPA), 2004b, ***Region 9 Preliminary Remediation Goals (PRG) Table***, San Francisco, California, October.

U.S. Environmental Protection Agency (EPA), 2004c, ***User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows 32-bit Version,*** Lead and IEUBK Technical Review Workgroup, Washington, D.C., May http://www.epa.gov/superfund/programs/lead/products.htm.

U.S. Environmental Protection Agency (EPA), 2004d, ***User's Guide and Background Technical Document for Region 9 Preliminary Remediation Goals (PRG) Table***, Region 9, San Francisco, California, October, <http://www.epa.gov/region09/waste/sfund /prg/files/04usersguide.pdf>.

U.S. Environmental Protection Agency (EPA), 2003, ***Human Health Toxicity Values in Superfund Risk Assessments***, Office of Solid Waste and Emergency Response, Washington, D.C., OSWER Directive 9285.7-53, December.

U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

U.S. Environmental Protection Agency (EPA), 1997a, ***Exposure Factors Handbook***, Office of Research and Development, National Center for Environmental Assessment, Washington, D.C., EPA/600/P-95/002Fa, August.

U.S. Environmental Protection Agency (EPA), 1997b, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, NTIS No. PB97-921199.

U.S. Environmental Protection Agency (EPA), 1996, ***Soil Screening Guidance: Technical Background Document***, Office of Solid Waste and Emergency Response, EPA/540/R-95/128, NTIS No. PB96-963502.

U.S. Environmental Protection Agency (EPA), 1994, ***Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities,*** Office of Solid Waste and Emergency Response, Draft, April, EPA530-R-94-021, including Errata, "Guidance for Performing Screening Level Risk Analyses at Combustion Facilities Burning Hazardous Wastes," October, and "Modification of Screening Guidance Fate and Transport Equations, November.

U.S. Environmental Protection Agency (EPA), 1992, ***Guidance on Risk Characterization for Risk Managers and Risk Assessors,*** Memorandum from F. Henry Habicht II, Deputy Administrator, to Assistant Administrators, Regional Administrators, February.

U.S. Environmental Protection Agency (EPA), 1991a, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance, Standard Default Exposure Factors***, Interim Final, Office of Solid Waste and Emergency Response, OSWER Directive: 9285.6-03.

U.S. Environmental Protection Agency (EPA), 1991b, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part B, Development of Risk-based***

Preliminary Remediation Goals, Interim, Office of Emergency and Remedial Response, December, EPA/540/R-92/003.

U.S. Environmental Protection Agency (EPA), 1990, “National Oil and Hazardous Substances Pollution Contingency Plan,” ***Federal Register*** 55(46): 8666-8865.

U.S. Environmental Protection Agency (EPA), 1989a, ***Risk Assessment Guidance for Superfund***, ***Volume I, Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002.

U.S. Environmental Protection Agency (EPA), 1989b, ***General Quantitative Risk Assessment Guidelines for Noncancer Health Effects***, prepared by the Office of Health and Environmental Assessment, Cincinnati, Ohio, for the Risk Assessment Forum, ECAO-CIN-538.

U.S. Environmental Protection Agency (EPA), 1986, "Guidelines for Carcinogen Risk Assessment," ***Federal Register***, 51(185): 33992-34003.

U.S. Geological Survey, 1992, ***Hydraulic Properties of Three Types of Glacial Deposits in Ohio***, Water-Resources Investigation Report 92-4135.

TABLES

Table 2-1

Summary of Samples Evaluated in the Baseline Human Health Risk Assessment
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Location	Sample Number	Sample Type	Sample Date	Depth (ft bgs)	Analyses
Surface Soil					
PBOW99-SSW101	PBOW99SSW101	REG	10-Jun-99	0.5 - 1	Explosives, Gen Chem, Metals, SVOC
PBOW99-SSW102	PBOW99SSW102	REG	10-Jun-99	0.5 - 1	Explosives, Metals, PCB, SVOC, VOC
PBOW99-SSW103	PBOW99SSW103	REG	10-Jun-99	0.5 - 1	Explosives, Metals, PCB, SVOC, VOC
PBOW99-SSW104	PBOW99SSW104	REG	10-Jun-99	0.5 - 1	Explosives, Metals
PBOW99-SSW104	PBOW99SSW105	REG	10-Jun-99	0.5 - 1	Explosives, Metals
PBOW99-SSW106	PBOW99SSW106	REG	10-Jun-99	0.5 - 1	Explosives, Metals, PCB, SVOC, VOC
PBOW99-SSW107	PBOW99SSW107	REG	10-Jun-99	0.5 - 1	Explosives, Metals
PBOW99-SSW108	PBOW99SSW108	REG	10-Jun-99	0.5 - 1	Explosives*, Metals
PBOW99-SSW108	PBOW99SSW110	FD	10-Jun-99	0.5 - 1	Explosives*, Metals
PBOW99-SSW109	PBOW99SSW109	REG	10-Jun-99	0.5 - 1	Explosives, Metals
PBOW99-SSW108	SSW-108-NE	REG	18-Nov-10	0 - 1	Explosives
PBOW99-SSW108	SSW-108-NW	REG	18-Nov-10	0 - 1	Explosives
PBOW99-SSW108	SSW-108-R	REG	18-Nov-10	0 - 1	Explosives
PBOW99-SSW108	SSW-108-S	REG	18-Nov-10	0 - 1	Explosives
WWTP1-SB07	WW0021	REG	3-Dec-08	1 - 2	Explosives, Metals, PCB, SVOC
WWTP1-SB06	WW0017	REG	3-Dec-08	1.1 - 2.1	Explosives, Metals, PCB, SVOC
WWTP1-SB06	WW0018	FD	3-Dec-08	1.1 - 2.1	Explosives, Metals, PCB, SVOC
WWTP1-SB03	WW0008	REG	4-Dec-08	1.2 - 2.2	Explosives, Metals, PCB, SVOC
WWTP1-SB02	WW0004	REG	4-Dec-08	1.6 - 2.6	Explosives, Metals, PCB, SVOC
WWTP1-SB04	WW0011	REG	4-Dec-08	1.7 - 2.7	Explosives, Metals, PCB, SVOC
WWTP1-SB08	WW0024	REG	4-Dec-08	1.8 - 2.8	Explosives, Metals, PCB, SVOC
WWTP1-SB05	WW0014	REG	4-Dec-08	2.2 - 3.2	Explosives, Metals, PCB, SVOC
WWTP1-SB01	WW0001	REG	5-Dec-08	2.6 - 3.6	Explosives, Gen Chem, Metals, PCB, SVOC

Table 2-1

Summary of Samples Evaluated in the Baseline Human Health Risk Assessment
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Location	Sample Number	Sample Type	Sample Date	Depth (ft bgs)	Analyses
Subsurface Soil					
WWTP1-SB07	WW0022	REG	3-Dec-08	5 - 6	Explosives, Metals, PCB, SVOC
WWTP1-SB06	WW0019	REG	3-Dec-08	5 - 6.1	Explosives, Metals, PCB, SVOC
WWTP1-SB03	WW0009	REG	4-Dec-08	5 - 6.2	Explosives, Metals, PCB, SVOC
WWTP1-SB02	WW0005	REG	4-Dec-08	5 - 6.6	Explosives, Metals, PCB, SVOC
WWTP1-SB02	WW0006	FD	4-Dec-08	5 - 6.6	Explosives, Metals, PCB, SVOC
WWTP1-SB04	WW0012	REG	4-Dec-08	5 - 6.7	Explosives, Metals, PCB, SVOC
WWTP1-SB08	WW0025	REG	4-Dec-08	5 - 6.8	Explosives, Metals, PCB, SVOC
WWTP1-SB05	WW0015	REG	4-Dec-08	5.2 - 7.2	Explosives, Metals, PCB, SVOC
WWTP1-SB01	WW0002	REG	5-Dec-08	5.6 - 7.6	Explosives, Metals, PCB, SVOC
WWTP1-SB01	WW0003	REG	5-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB02	WW0007	REG	4-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB03	WW0010	REG	4-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB04	WW0013	REG	4-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB05	WW0016	REG	4-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB06	WW0020	REG	3-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB07	WW0023	REG	3-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB08	WW0026	REG	4-Dec-08	8 - 10	Explosives, Metals, SVOC
WWTP1-SB08	WW0027	FD	4-Dec-08	8 - 10	Explosives, Metals, SVOC
GROUNDWATER					
Bedrock					
WTP1-BEDGW-002	WW3030	REG	29-Oct-09	NA	Explosives, Field Test, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-BEDGW-003	WW3020	REG	9-May-09	NA	Explosives, Field Test, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-BEDGW-003	WW3031	REG	3-Nov-09	NA	Explosives, Field Test, Gen Chem, Metals (f & uf), SVOC, VOC
Overburden-Monitoring Well					
WTP1-MW01	WW3015	REG	7-May-09	NA	Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-MW01	WW3027A	REG	28-Oct-09	NA	Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-MW02	WW3016	REG	8-May-09	NA	Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-MW02	WW3028A	REG	29-Oct-09	NA	Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-MW03	WW3017	REG	9-May-09	NA	Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC, VOC
WTP1-MW03	WW3029	REG	29-Oct-09	NA	Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC, VOC
Sediment					

Table 2-1

Summary of Samples Evaluated in the Baseline Human Health Risk Assessment
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Location	Sample Number	Sample Type	Sample Date	Depth (ft bgs)	Analyses
PBOW99-SDW101	PBOW99SDW101	REG	9-Jun-99	0 - 0	Explosives, Metals, SVOC
PBOW99-SDW102	PBOW99SDW102	REG	9-Jun-99	0 - 0	Explosives, Metals, SVOC
PBOW99-SDW103	PBOW99SDW103	REG	9-Jun-99	0 - 0	Explosives, Metals, SVOC
PBOW99-SDW104	PBOW99SDW104	REG	9-Jun-99	0 - 0	Explosives, Metals, SVOC
PBOW99-SDW104	PBOW99SDW105	FD	9-Jun-99	0 - 0	Explosives, Metals, SVOC
WWTP1-SD01	WW1000	REG	21-May-09	0 - 0.5	Gen Chem, PCB
WWTP1-SD02	WW1001	REG	21-May-09	0 - 0.5	Gen Chem, PCB
WWTP1-SD03	WW1002	REG	20-May-09	0 - 0.5	Gen Chem, PCB
WWTP1-SD04	WW1003	REG	20-May-09	0 - 0.5	Gen Chem, PCB
Surface Water					
WWTP1-SW01	WW2000	REG	21-May-09	0 - 0	Explosives, Metals, SVOC

*Data excluded and replaced using data collected in November 2010.
ft bgs - Feet below ground surface.
f & uf - Metals analysis performed on filtered and unfiltered samples, respectively.
FD - Field duplicate; averaged with the regular sample at the same location to create one result.
Gen Chem - General Chemistry.
PCB - Polychlorinated biphenyls.
REG - Regular sample.
SVOC - Semivolatile organic compounds.
VOC - Volatile organic compounds.

Table 2-2

Background Screening Concentrations of Inorganics in Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works
Sandusky, Ohio

Chemical Name (mg/kg)	Frequency of Detection	Range of Detected Concentrations	Range of Reporting Limits	Statistical Distribution	Arithmetic Mean	95% UTL [a]	Background Screening Criterion [b]
Aluminum	12 / 12	3520 - 15500	NA	L	8.43E+03	2.69E+04	15500
Antimony	9 / 25	5.9 - 9.3	5.4 - 74	NP	4.68E+00	NA	9.30
Arsenic	23 / 26	2.1 - 36.5	1.2 - 3.7	L	1.08E+01	7.10E+01	36.5
Barium	9 / 12	35.6 - 826	23.2 - 24.7	L	1.16E+02	1.30E+03	826
Beryllium	6 / 25	0.57 - 1	0.57 - 1.2	L	5.65E-01	1.17E+00	1.00
Cadmium	0 / 25	NA	0.57 1.2	L	4.49E-01	NA	NA
Calcium	12 / 12	735 - 52300	NA	L	1.13E+04	2.18E+05	52300
Chromium	25 / 26	4.4 - 29	12.3 - 12.3	NP	1.34E+01	NA	29.0
Cobalt	9 / 12	9.6 - 116	5.8 - 6.2	L	2.26E+01	2.48E+02	116
Copper	23 / 26	2.3 - 56.2	2.2 - 2.9	L	1.70E+01	1.47E+02	56.2
Iron	12 / 12	5880 - 234000	NA	L	4.01E+04	3.58E+05	234000
Lead	26 / 26	1.9 - 48.6	NA	L	1.28E+01	5.13E+01	48.6
Magnesium	12 / 12	629 - 10400	NA	L	3.26E+03	3.08E+04	10400
Manganese	26 / 26	21 - 13300	NA	L	7.29E+02	3.51E+03	3506
Mercury	2 / 26	0.085 - 0.085	0.037 - 0.3	L	9.06E-02	5.60E-01	0.085
Nickel	26 / 26	5.4 - 55.1	NA	L	2.28E+01	7.79E+01	55.1
Potassium	11 / 12	579 - 3390	617 - 617	L	1.24E+03	6.08E+03	3390
Selenium	5 / 25	0.61 - 2	0.57 - 4.9	NP	1.55E+00	NA	2.00
Silver	2 / 26	1.1 - 11.1	1.1 - 1.3	NP	1.00E+00	NA	11.1
Sodium	0 / 12	NA	566 - 663	L	3.03E+02	NA	NA
Thallium	2 / 25	1.2 - 1.3	1.1 - 6.1	NP	1.91E+00	NA	1.30
Vanadium	11 / 12	9 - 40.9	61.7 - 61.7	L	2.48E+01	8.31E+01	40.9
Zinc	26 / 26	6.6 - 655	NA	L	7.30E+01	3.22E+02	322

L - Lognormal.
mg/kg - Milligrams per kilogram.
NP - Nonparametric.
NA - Not applicable; not available.

[a] 95% UTL - 95% upper tolerance limit calculated as described in Shaw (2005).

[b] The maximum detected concentration is used as the background screening criterion for nonparametric data sets; for normal or lognormal data sets, the 95% UTL or the maximum detected concentration, whichever is less, is used.

Note: Detection limits from sample 6990 were deleted when calculating results for antimony, beryllium, cadmium, selenium, and thallium. The detection limits were elevated by dilution factors which greatly exceed any detected concentration and would bias results unrealistically high.

Source: Shaw Environmental, Inc. (Shaw), 2005, 2004 Data Summary and Evaluation Report, Final, Plum Brook Ordnance Works, Sandusky, Ohio, April.

Table 2-3

Background Screening Concentrations of Inorganics in Groundwater Waste Water Treatment Plant 1 Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of Values, µg/L: Detected Concentrations Minimum	Detected Concentrations Maximum	Reporting Limits Minimum	Reporting Limits Maximum	Mean µg/L	Standard Deviation	UTL [a] µg/L	BSC [b] µg/L
Metals - Unfiltered										
Aluminum	11 / 13	85	3.15E+01	3.09E+02	2.00E+02	2.00E+02	1.05E+02	6.98E+01	4.17E+02	309
Arsenic	4 / 26	15	3.30E+00	7.40E+00	1.00E+01	1.00E+01	4.99E+00	6.56E-01	7.92E+00	7.4
Barium	28 / 28	100	2.58E+01	1.18E+04	2.00E+02	2.00E+03	1.73E+03	3.77E+03	1.86E+04	11800
Calcium	28 / 28	100	1.74E+04	3.16E+05	5.00E+03	5.00E+03	1.38E+05	8.31E+04	5.09E+05	316000
Cobalt	6 / 27	22	1.00E+00	1.21E+01	5.00E+01	5.00E+01	2.05E+01	8.75E+00	5.96E+01	12.1
Copper	2 / 28	7	3.30E+00	1.98E+01	2.50E+01	2.50E+01	1.24E+01	2.26E+00	2.25E+01	19.8
Iron	24 / 27	89	3.82E+01	1.55E+03	1.00E+02	1.00E+02	4.15E+02	4.87E+02	2.59E+03	1550
Magnesium	28 / 28	100	7.28E+03	2.17E+05	5.00E+03	5.00E+03	7.17E+04	5.85E+04	3.33E+05	217000
Manganese	28 / 28	100	3.60E+00	6.88E+02	1.50E+01	1.50E+01	8.12E+01	1.24E+02	6.36E+02	636
Nickel	4 / 27	15	4.80E+00	8.60E+00	4.00E+01	4.00E+01	1.81E+01	4.67E+00	3.90E+01	8.6
Potassium	28 / 28	100	2.53E+03	1.16E+05	5.00E+03	5.00E+04	2.70E+04	3.06E+04	1.64E+05	116000
Sodium	28 / 28	100	1.33E+04	1.39E+06	5.00E+03	5.00E+04	3.55E+05	4.36E+05	2.30E+06	1390000
Zinc	14 / 19	74	8.30E-01	5.07E+02	2.00E+01	2.00E+01	5.55E+01	1.23E+02	6.06E+02	507

[a] The UTL (upper tolerance limit) is calculated as described in Shaw (2005).

[b] The BSC (background screening criterion) is the calculated UTL or the maximum detected concentration, whichever is less.

µg/L - Micrograms per liter.

BTEX - Benzene, toluene, ethylbenzene, and xylenes.

Source: Shaw Environmental, Inc. (Shaw), 2005, 2004 Data Summary and Evaluation Report, Final, Plum Brook Ordnance Works, Sandusky, Ohio, April.

Table 2-4

Statistical Summary and Selection of Chemicals of Potential Concern in Surface Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	RBSC [b] mg/kg	COPC? [c,d]	95% UCL [e] mg/kg	EPC [f] mg/kg
Inorganics														
Aluminum	12 / 12	100	2.84E+03		8.02E+03		1.61E+00	2.68E+01	5.24E+03	1.55E+04	7.70E+03	N (b)		---
Antimony	4 / 12	33	2.99E-01	J	3.90E+00		4.02E-01	1.30E+00	7.35E-01	9.30E+00	3.10E+00	N (b)		---
Arsenic	17 / 17	100	9.98E-01		4.50E+00		8.04E-01	1.30E+00	3.03E+00	3.65E+01	3.90E-01	N (b)		---
Barium	16 / 17	94	1.39E+01		3.58E+01		1.61E-01	2.65E+01	2.18E+01	8.26E+02	1.50E+03	N (b)		---
Beryllium	8 / 12	67	4.21E+00	J	8.44E+00	J	1.61E-01	6.70E-01	3.91E+00	1.00E+00	1.60E+01	N (a)		---
Cadmium	1 / 17	6	5.08E-01	J/J	5.08E-01	J/J	2.20E-01	4.90E-01	1.86E-01	NA	7.00E+00	N (a)		---
Calcium	12 / 12	100	1.79E+03		2.01E+04		4.02E+00	6.70E+02	6.44E+03	5.23E+04	Nutrient	N (c)		---
Chromium	17 / 17	100	6.80E+00		1.76E+01	J	4.02E-01	6.60E-01	1.19E+01	2.90E+01	2.90E-01	N (b)		---
Cobalt	8 / 12	67	3.13E+00		5.26E+00	J	1.61E-01	6.70E+00	3.70E+00	1.16E+02	2.30E+00	N (b)		---
Copper	12 / 12	100	3.26E+00		1.24E+01		4.02E-01	3.30E+00	6.18E+00	5.62E+01	3.10E+02	N (b)		---
Iron	12 / 12	100	8.11E+03		2.86E+04	J	1.61E+00	1.34E+01	1.49E+04	2.34E+05	5.50E+03	N (b)		---
Lead	17 / 17	100	1.83E+00	J	1.15E+02		3.30E-01	4.90E-01	3.46E+01	4.86E+01	4.00E+02	N (a)		---
Magnesium	12 / 12	100	6.92E+02	J	4.16E+03		1.61E+00	6.70E+02	1.59E+03	1.04E+04	Nutrient	N (c)		---
Manganese	12 / 12	100	1.05E+02		5.19E+02	J	1.61E-01	2.00E+00	2.28E+02	3.51E+03	1.80E+02	N (b)		---
Mercury	10 / 17	59	1.46E-02	J	1.30E+00		2.02E-02	1.30E-01	1.38E-01	8.50E-02	2.30E+00	N (a)		---
Nickel	4 / 12	33	6.10E+00		9.00E+00		2.41E-01	5.40E+00	2.50E+00	5.51E+01	1.50E+02	N (b)		---
Potassium	8 / 12	67	1.43E+02		2.74E+02		2.01E+01	6.70E+02	2.31E+02	3.39E+03	Nutrient	N (c)		---
Selenium	2 / 17	12	6.13E-01	/U	7.60E-01		5.40E-01	9.79E-01	4.16E-01	2.00E+00	3.90E+01	N (b)		---
Sodium	8 / 12	67	3.33E+01		9.82E+01		8.04E+00	6.70E+02	1.38E+02	NA	Nutrient	N (c)		---
Vanadium	12 / 12	100	1.26E+01		5.67E+01		1.61E-01	6.70E+00	2.77E+01	4.09E+01	3.90E+01	Y	3.42E+01	3.42E+01
Zinc	12 / 12	100	2.39E+01		5.94E+01		2.01E+00	2.70E+00	3.40E+01	3.22E+02	2.30E+03	N (b)		---
Polychlorinated biphenyls (PCB)														
Aroclor 1016	1 / 11	9	2.94E-02	J	2.94E-02	J	3.60E-02	4.40E-02	2.05E-02		3.90E-01	N (a)		---
Aroclor 1232	1 / 11	9	3.28E-02	J	3.28E-02	J	3.60E-02	4.40E-02	2.07E-02		1.40E-01	N (a)		---
Aroclor 1254	3 / 11	27	7.40E-02		1.80E-01		3.60E-02	4.40E-02	4.50E-02		1.10E-01	Y	1.05E-01	1.05E-01
Aroclor 1260	5 / 11	45	4.10E-02	J	1.24E-01		3.60E-02	4.40E-02	4.44E-02		2.20E-01	N (a)		---
Explosives														
Amino-2,6-dinitrotoluene, 4-	6 / 20	30	1.54E-01	J	8.06E+00		2.50E-01	5.00E+00	9.10E-01		1.50E+01	N (a)		---
Amino-4,6-dinitrotoluene, 2-	8 / 20	40	9.32E-02	J	6.02E+00		2.50E-01	5.00E+00	8.86E-01		1.50E+01	N (a)		---
Dinitrotoluene, 2,4-	1 / 20	5	1.76E-01	J	1.76E-01	J	1.50E-01	5.00E+00	2.53E-01		7.10E-01	N (a)		---
RDX	1 / 20	5	2.39E-01		2.39E-01		1.50E-01	1.00E+01	4.22E-01		5.50E+00	N (a)		---
Tetryl	1 / 20	5	5.87E-01		5.87E-01		1.50E-01	1.30E+01	5.36E-01		2.40E+01	N (a)		---
Trinitrobenzene, 1,3,5-	4 / 20	20	1.16E-01	J	8.36E-01		1.50E-01	5.00E+00	3.02E-01		2.20E+02	N (a)		---
Trinitrotoluene, 2,4,6-	9 / 20	45	1.53E-01	J/U	1.30E+02		2.50E-01	5.00E+00	1.10E+01		3.60E+00	Y	2.32E+01	2.32E+01
Semivolatile Organic Compounds														
Benzo(a)anthracene	3 / 12	25	4.44E-02	J/J	5.10E-01		3.60E-01	4.40E-01	2.03E-01		1.50E-01	Y	2.12E-01	2.12E-01
Benzo(a)pyrene	3 / 12	25	1.15E-01	J	4.20E-01		3.60E-01	4.40E-01	2.01E-01		1.50E-02	Y	2.03E-01	2.03E-01
Benzo(b)fluoranthene	3 / 12	25	1.37E-01	J/U	5.50E-01		3.60E-01	4.40E-01	2.19E-01		1.50E-01	Y	2.68E-01	2.68E-01
Chrysene	3 / 12	25	4.96E-02	J/J	4.50E-01		3.60E-01	4.40E-01	1.98E-01		1.50E+01	N (a)		---
Dinitrotoluene, 2,4-	1 / 12	8	3.75E-02	J	3.75E-02	J	3.60E-01	4.40E-01	1.82E-01		7.10E-01	N (a)		---
Fluoranthene	3 / 12	25	9.03E-02	J/J	1.20E+00		3.60E-01	4.40E-01	2.69E-01		2.30E+02	N (a)		---
Indeno(1,2,3-cd)pyrene	2 / 12	17	2.71E-01	J/J	2.95E-01	J	3.60E-01	4.40E-01	2.08E-01		1.50E-01	Y	2.28E-01	2.28E-01
Phenanthrene	3 / 12	25	5.79E-02	J	9.40E-01		3.60E-01	4.40E-01	2.39E-01		1.70E+02 g	N (a)		---
Pyrene	3 / 12	25	7.31E-02	J/J	8.60E-01		3.60E-01	4.40E-01	2.37E-01		1.70E+02	N (a)		---

Table 2-4

Statistical Summary and Selection of Chemicals of Potential Concern in Surface Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	RBSC [b] mg/kg	COPC? [c,d]	95% UCL [e] mg/kg	EPC [f] mg/kg

mg/kg - Milligrams per kilogram.
BSC - Background screening concentration.
COPC - Chemical of potential concern
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
/ - When in the VQ column, this separates two qualifiers from field duplicate samples, where the concentration is the averaged field duplicate concentrations.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.
U - The sample result was nondetect.
RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine.

[a] IT Corporation (IT), 1998, *Site Investigation of Acid Areas* , Plum Brook Ordnance Works, Sandusky, Ohio, August.
[b] Risk-Based Screening Concentrations based on U.S. Environmental Protection Agency (EPA) Regional Screening Level Table (November 2010) residential soil values and are based on a risk level of 1.0E-06 and a hazard index of 0.1.
[c] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = maximum detected concentration is less than the BSC.
(c) = essential nutrient.
[d] Y = Chemical is chosen as a COPC.
[e] 95% UCL (Upper confidence limit) determined using ProUCL Version 4.00.05 U.S. Environmental Protection Agency (EPA), 2010, ProUCL Version 4.00.05, Office of Research and Development, Las Vegas, Nevada, and Technology Support Center, Atlanta, GA, May, on line at http://www.epa.gov/esd/tsc/TSC_form.htm.
[f] Exposure point concentration (EPC) used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower. The EPC used to evaluate lead using the Lead Model (see text for details) is equal to the arithmetic mean.
[g] RBSC based on pyrene.

Table 2-5

Statistical Summary and Selection of Chemicals of Potential Concern in Subsurface Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	RBSC [b] mg/kg		COPC? [c,d]
Inorganics													
Aluminum	16 / 16	100	2.21E+03		1.50E+04		1.62E+00	2.10E+00	7.75E+03	1.55E+04	7.70E+03		N (b)
Antimony	1 / 16	6	4.88E-01	J	4.88E-01	J	4.01E-01	4.86E-01	2.42E-01	9.30E+00	3.10E+00		N (b)
Arsenic	16 / 16	100	1.14E+00		1.08E+01		8.01E-01	9.71E-01	4.58E+00	3.65E+01	3.90E-01		N (b)
Barium	16 / 16	100	7.69E+00		1.12E+02		1.62E-01	2.10E-01	4.30E+01	8.26E+02	1.50E+03		N (b)
Beryllium	16 / 16	100	2.14E+00	J	8.89E+00	J	1.62E-01	2.10E-01	5.69E+00	1.00E+00	1.60E+01		N (a)
Cadmium	2 / 16	13	2.72E-01	J	2.96E-01	J	4.01E-01	4.86E-01	2.33E-01	NA	7.00E+00		N (a)
Calcium	16 / 16	100	9.00E+03		5.03E+04	J	4.05E+00	5.25E+00	3.82E+04	5.23E+04	Nutrient		N (c)
Chromium	16 / 16	100	4.96E+00	J	2.20E+01		4.05E-01	5.25E-01	1.28E+01	2.90E+01	2.90E-01		N (b)
Cobalt	16 / 16	100	2.21E+00		1.32E+01	J	1.62E-01	2.10E-01	7.75E+00	1.16E+02	2.30E+00		N (b)
Copper	16 / 16	100	3.96E+00		2.89E+01		4.05E-01	5.25E-01	1.86E+01	5.62E+01	3.10E+02		N (b)
Iron	16 / 16	100	6.48E+03	J	2.72E+04	J	1.62E+00	2.10E+00	1.77E+04	2.34E+05	5.50E+03		N (b)
Lead	16 / 16	100	4.73E+00	J	1.77E+01	J	4.01E-01	4.86E-01	1.03E+01	4.86E+01	4.00E+02		N (b)
Magnesium	16 / 16	100	2.74E+03	J	1.89E+04		1.62E+00	2.10E+00	1.17E+04	1.04E+04	Nutrient		N (c)
Manganese	16 / 16	100	8.42E+01		4.91E+02	J	1.62E-01	2.10E-01	3.31E+02	3.51E+03	1.80E+02		N (b)
Mercury	6 / 16	38	1.14E-02	J	1.91E-02	J	1.96E-02	2.44E-02	1.19E-02	8.50E-02	2.30E+00		N (b)
Nickel	13 / 16	81	1.85E+00		2.07E+01		2.43E-01	3.15E-01	1.04E+01	5.51E+01	1.50E+02		N (b)
Potassium	16 / 16	100	2.06E+02		2.28E+03		2.03E+01	2.62E+01	1.10E+03	3.39E+03	Nutrient		N (c)
Sodium	16 / 16	100	6.20E+01		7.83E+02		8.10E+00	1.05E+01	2.47E+02	NA	Nutrient		N (c)
Thallium	10 / 16	63	2.42E-01	J	4.29E-01	J	4.01E-01	4.86E-01	3.07E-01	1.30E+00	5.10E-01	g	N (b)
Vanadium	16 / 16	100	1.23E+01		2.56E+01		1.62E-01	2.10E-01	1.98E+01	4.09E+01	3.90E+01		N (b)
Zinc	16 / 16	100	1.56E+01		8.57E+01		2.03E+00	2.62E+00	4.99E+01	3.22E+02	2.30E+03		N (b)
Polychlorinated biphenyls (PCB)													
Aroclor 1016	2 / 8	25	8.01E-02	J/J	1.31E-01	J	3.90E-02	4.04E-02	4.14E-02		3.90E-01		N (a)
Aroclor 1242	1 / 8	13	4.32E-02	J	4.32E-02	J	3.90E-02	4.04E-02	2.28E-02		2.20E-01		N (a)
Aroclor 1260	2 / 8	25	1.26E-02	J	1.97E-02	J	3.90E-02	4.04E-02	1.90E-02		2.20E-01		N (a)
Explosives													
Amino-2,6-dinitrotoluene, 4-	5 / 16	31	1.68E-01	J	2.95E+00		2.74E-01	3.17E-01	3.46E-01		1.50E+01		N (a)
Amino-4,6-dinitrotoluene, 2-	6 / 16	38	1.93E-01	J/U	7.74E+00		2.74E-01	1.53E+00	1.19E+00		1.50E+01		N (a)
Dinitrobenzene, 1,3-	1 / 16	6	9.22E-01		9.22E-01		2.74E-01	3.17E-01	1.94E-01		6.10E-01		Y
Dinitrotoluene, 2,4-	9 / 16	56	1.92E-01	J	9.47E+00		2.74E-01	1.53E+00	1.43E+00		7.10E-01		Y
Dinitrotoluene, 2,6-	5 / 16	31	1.88E-01	U/J	2.03E+00		2.74E-01	3.17E-01	3.68E-01		7.10E-01		Y
Tetryl	1 / 16	6	2.94E+00		2.94E+00		2.74E-01	3.17E-01	3.21E-01		2.40E+01		N (a)
Trinitrobenzene, 1,3,5-	1 / 16	6	2.60E+00		2.60E+00		2.74E-01	3.17E-01	3.00E-01		2.20E+02		N (a)
Trinitrotoluene, 2,4,6-	6 / 16	38	1.69E-01	J/J	1.81E+02		2.74E-01	2.80E+01	1.17E+01		3.60E+00		Y
Semivolatile Organic Compounds													
Acenaphthylene	1 / 16	6	4.67E-02	J	4.67E-02	J	3.73E-01	4.04E-01	1.87E-01		3.40E+02	h	N (a)
Benzo(a)anthracene	1 / 16	6	1.69E-01	J	1.69E-01	J	3.73E-01	4.04E-01	1.95E-01		1.50E-01		Y
Benzo(a)pyrene	1 / 16	6	1.90E-01	J	1.90E-01	J	3.73E-01	4.04E-01	1.96E-01		1.50E-02		Y
Benzo(b)fluoranthene	1 / 16	6	2.79E-01	J	2.79E-01	J	3.73E-01	4.04E-01	2.01E-01		1.50E-01		Y
Benzo(ghi)perylene	1 / 16	6	1.05E-01	J	1.05E-01	J	3.73E-01	4.04E-01	1.91E-01		1.70E+02	i	N (a)

Table 2-5

Statistical Summary and Selection of Chemicals of Potential Concern in Subsurface Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	RBSC [b] mg/kg		COPC? [c,d]
Bis(2-ethylhexyl)phthalate	1 / 16	6	5.68E-02	J	5.68E-02	J	3.73E-01	4.04E-01	1.87E-01		3.50E+01		N (a)
Chrysene	1 / 16	6	1.50E-01	J	1.50E-01	J	3.73E-01	4.04E-01	1.93E-01		1.50E+01		N (a)
Diphenylamine	1 / 16	6	1.14E-01	U/J	1.14E-01	U/J	3.73E-01	4.04E-01	1.92E-01		1.50E+02		N (a)
Fluoranthene	1 / 16	6	2.21E-01	J	2.21E-01	J	3.73E-01	4.04E-01	1.98E-01		2.30E+02		N (a)
Indeno(1,2,3-cd)pyrene	1 / 16	6	3.43E-01	J	3.43E-01	J	3.73E-01	4.04E-01	2.05E-01		1.50E-01		Y
Nitroaniline, 3-	3 / 16	19	5.34E-02	J	7.06E-01		3.73E-01	4.04E-01	2.18E-01		6.10E+01	j	N (a)
Phenanthrene	5 / 16	31	4.24E-02	J	6.31E-02	J	3.73E-01	4.04E-01	1.53E-01		1.70E+02	i	N (a)
Pyrene	1 / 16	6	2.14E-01	J	2.14E-01	J	3.73E-01	4.04E-01	1.97E-01		1.70E+02		N (a)

BSC - Background screening criterion.
COPC - Chemical of potential concern.
mg/kg - Milligrams per kilogram.
BSC - Background screening concentration.
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
/ - When in the VQ column, this separates two qualifiers from field duplicate samples, where the concentration is the averaged field duplicate concentrations.
U - The sample result was nondetect.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.
NA - Not available.

[a] IT Corporation (IT), 1998, *Site Investigation of Acid Areas* , Plum Brook Ordnance Works, Sandusky, Ohio, August.
[b] Risk-Based Screening Concentrations based on U.S. Environmental Protection Agency (EPA) Regional Screening Level Table (November 2010) residential soil values a
are based on a risk level of 1.0E-06 and a hazard index of 0.1.
[c] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = maximum detected concentration is less than the BSC.
(c) = essential nutrient.
[d] Y = Chemical is chosen as a COPC.
[e] 95% UCL (Upper confidence limit) determined using ProUCL Version 4.00.05 (U.S. Environmental Protection Agency (EPA), 2010, Office of Research and Development
Nevada, and Technology Support Center, Atlanta, GA, May, on line at http://www.epa.gov/esd/tsc/TSC_form.htm. Calculated only for COPC.
[f] Exposure point concentration (EPC) used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower.
[g] RBSC based on thallium from IRIS, 2009.
[h] RBSC based on acenaphthene.
[i] RBSC based on pyrene.
[j] RBSC based on 2-nitroaniline.

Table 2-6

Statistical Summary and Selection of Chemicals of Potential Concern in Total Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	RBSC [b] mg/kg	COPC? [c,d]	95% UCL [e] mg/kg	EPC [f] mg/kg
Inorganics														
Aluminum	28 / 28	100	2.21E+03		1.50E+04		1.61E+00	2.68E+01	6.68E+03	1.55E+04	7.70E+03	N (b)		---
Antimony	5 / 28	18	2.99E-01	J	3.90E+00		4.01E-01	1.30E+00	4.53E-01	9.30E+00	3.10E+00	N (b)		---
Arsenic	33 / 33	100	9.98E-01		1.08E+01		8.01E-01	1.30E+00	3.78E+00	3.65E+01	3.90E-01	N (b)		---
Barium	32 / 33	97	7.69E+00		1.12E+02		1.61E-01	2.65E+01	3.21E+01	8.26E+02	1.50E+03	N (a)		---
Beryllium	24 / 28	86	2.14E+00	J	8.89E+00	J	1.61E-01	6.70E-01	4.93E+00	1.00E+00	1.60E+01	N (a)		---
Cadmium	3 / 33	9	2.72E-01	J	5.08E-01	J/J	2.20E-01	4.90E-01	2.09E-01	NA	7.00E+00	N (a)		---
Calcium	28 / 28	100	1.79E+03		5.03E+04	J	4.02E+00	6.70E+02	2.46E+04	5.23E+04	Nutrient	N (c)		---
Chromium	33 / 33	100	4.96E+00	J	2.20E+01		4.02E-01	6.60E-01	1.23E+01	2.90E+01	2.90E-01	N (b)		---
Cobalt	24 / 28	86	2.21E+00		1.32E+01	J	1.61E-01	6.70E+00	6.01E+00	1.16E+02	2.30E+00	N (b)		---
Copper	28 / 28	100	3.26E+00		2.89E+01		4.02E-01	3.30E+00	1.33E+01	5.62E+01	3.10E+02	N (a)		---
Iron	28 / 28	100	6.48E+03	J	2.86E+04	J	1.61E+00	1.34E+01	1.65E+04	2.34E+05	5.50E+03	N (b)		---
Lead	33 / 33	100	1.83E+00	J	1.15E+02		3.30E-01	4.90E-01	2.28E+01	4.86E+01	4.00E+02	N (a)		---
Magnesium	28 / 28	100	6.92E+02	J	1.89E+04		1.61E+00	6.70E+02	7.36E+03	1.04E+04	Nutrient	N (c)		---
Manganese	28 / 28	100	8.42E+01		5.19E+02	J	1.61E-01	2.00E+00	2.87E+02	3.51E+03	1.80E+02	N (b)		---
Mercury	16 / 33	48	1.14E-02	J	1.30E+00		1.96E-02	1.30E-01	7.68E-02	8.50E-02	2.30E+00	N (a)		---
Nickel	17 / 28	61	1.85E+00		2.07E+01		2.41E-01	5.40E+00	7.01E+00	5.51E+01	1.50E+02	N (a)		---
Potassium	24 / 28	86	1.43E+02		2.28E+03		2.01E+01	6.70E+02	7.26E+02	3.39E+03	Nutrient	N (c)		---
Selenium	2 / 33	6	6.13E-01	/U	7.60E-01		5.40E-01	9.79E-01	4.34E-01	2.00E+00	3.90E+01	N (a)		---
Sodium	24 / 28	86	3.33E+01		7.83E+02		8.04E+00	6.70E+02	2.00E+02	NA	Nutrient	N (c)		---
Thallium	10 / 28	36	2.42E-01	J	4.29E-01	J	4.01E-01	1.30E+00	3.27E-01	1.30E+00	5.10E-01 g	N (a)		
Vanadium	28 / 28	100	1.23E+01		5.67E+01		1.61E-01	6.70E+00	2.32E+01	4.09E+01	3.90E+01	Y	2.62E+01	2.62E+01
Zinc	28 / 28	100	1.56E+01		8.57E+01		2.01E+00	2.70E+00	4.31E+01	3.22E+02	2.30E+03	N (a)		---
Polychlorinated biphenyls (PCB)														
Aroclor 1016	3 / 19	16	2.94E-02	J	1.31E-01	J	3.60E-02	4.40E-02	2.93E-02		3.90E-01	N (a)		---
Aroclor 1232	1 / 19	5	3.28E-02	J	3.28E-02	J	3.60E-02	4.40E-02	2.03E-02		1.40E-01	N (a)		---
Aroclor 1242	1 / 19	5	4.32E-02	J	4.32E-02	J	3.60E-02	4.40E-02	2.09E-02		2.20E-01	N (a)		---
Aroclor 1254	3 / 19	16	7.40E-02		1.80E-01		3.60E-02	4.40E-02	3.44E-02		1.10E-01	Y	9.17E-02	9.17E-02
Aroclor 1260	7 / 19	37	1.26E-02	J	1.24E-01		3.60E-02	4.40E-02	3.37E-02		2.20E-01	N (a)		---
Explosives														
Amino-2,6-dinitrotoluene, 4-	11 / 36	31	1.54E-01	J	8.06E+00		2.50E-01	5.00E+00	6.60E-01		1.50E+01	N (a)		---
Amino-4,6-dinitrotoluene, 2-	14 / 36	39	9.32E-02	J	7.74E+00		2.50E-01	5.00E+00	1.02E+00		1.50E+01	N (a)		---
Dinitrobenzene, 1,3-	1 / 36	3	9.22E-01		9.22E-01		1.50E-01	5.00E+00	2.22E-01		6.10E-01	Y	5.22E-01	5.22E-01
Dinitrotoluene, 2,4-	10 / 36	28	1.76E-01	J	9.47E+00		1.50E-01	5.00E+00	7.77E-01		7.10E-01	Y	1.25E+00	1.25E+00
Dinitrotoluene, 2,6-	5 / 36	14	1.88E-01	U/J	2.03E+00		1.50E-01	5.00E+00	3.00E-01		7.10E-01	Y	5.47E-01	5.47E-01
RDX	1 / 36	3	2.39E-01		2.39E-01		1.50E-01	1.00E+01	2.99E-01		5.50E+00	N (a)		---
Tetryl	2 / 36	6	5.87E-01		2.94E+00		1.50E-01	1.30E+01	4.41E-01		2.40E+01	N (a)		---
Trinitrobenzene, 1,3,5-	5 / 36	14	1.16E-01	J	2.60E+00		1.50E-01	5.00E+00	3.01E-01		2.20E+02	N (a)		---
Trinitrotoluene, 2,4,6-	15 / 36	42	1.53E-01	J/U	1.81E+02		2.50E-01	2.80E+01	1.13E+01		3.60E+00	Y	2.20E+01	2.20E+01
Semivolatile Organic Compounds														
Acenaphthylene	1 / 28	4	4.67E-02	J	4.67E-02	J	3.60E-01	4.40E-01	1.90E-01		3.40E+02 h	N (a)		---
Benzo(a)anthracene	4 / 28	14	4.44E-02	J/J	5.10E-01		3.60E-01	4.40E-01	1.98E-01		1.50E-01	Y	1.98E-01	1.98E-01
Benzo(a)pyrene	4 / 28	14	1.15E-01	J	4.20E-01		3.60E-01	4.40E-01	1.98E-01		1.50E-02	Y	2.08E-01	2.08E-01
Benzo(b)fluoranthene	4 / 28	14	1.37E-01	J/U	5.50E-01		3.60E-01	4.40E-01	2.09E-01		1.50E-01	Y	2.98E-01	2.98E-01
Benzo(ghi)perylene	1 / 28	4	1.05E-01	J	1.05E-01	J	3.60E-01	4.40E-01	1.92E-01		1.70E+02 i	N (a)		---

Table 2-6

Statistical Summary and Selection of Chemicals of Potential Concern in Total Soil
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	RBSC [b] mg/kg		COPC? [c,d]	95% UCL [e] mg/kg	EPC [f] mg/kg
Bis(2-ethylhexyl)phthalate	1 / 28	4	5.68E-02	J	5.68E-02	J	3.60E-01	4.40E-01	1.90E-01		3.50E+01		N (a)		---
Chrysene	4 / 28	14	4.96E-02	J/J	4.50E-01		3.60E-01	4.40E-01	1.95E-01		1.50E+01		N (a)		---
DIPHENYLAMINE	1 / 24	4	1.14E-01	U/J	1.14E-01	U/J	3.73E-01	4.05E-01	1.93E-01		1.50E+02		N (a)		---
Fluoranthene	4 / 28	14	9.03E-02	J/J	1.20E+00		3.60E-01	4.40E-01	2.28E-01		2.30E+02		N (a)		---
Indeno(1,2,3-cd)pyrene	3 / 28	11	2.71E-01	J/J	3.43E-01	J	3.60E-01	4.40E-01	2.07E-01		1.50E-01		Y	3.39E-01	3.39E-01
Nitroaniline, 3-	3 / 28	11	5.34E-02	J	7.06E-01		3.73E-01	1.10E+00	2.47E-01		6.10E+01	j	N (a)		---
Phenanthrene	8 / 28	29	4.24E-02	J	9.40E-01		3.60E-01	4.40E-01	1.90E-01		1.70E+02	i	N (a)		---
Pyrene	4 / 28	14	7.31E-02	J/J	8.60E-01		3.60E-01	4.40E-01	2.14E-01		1.70E+02		N (a)		---

BSC - Background screening concentration.
COPC - Chemical of potential concern.
mg/kg - Milligrams per kilogram.
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
/ - When in the VQ column, this separates two qualifiers from field duplicate samples, where the concentration is the averaged field duplicate concentrations.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.
U - The sample result was nondetect.

[a] IT Corporation (IT), 1998, *Site Investigation of Acid Areas* , Plum Brook Ordnance Works, Sandusky, Ohio, August.
[b] Risk-Based Screening Concentrations based on U.S. Environmental Protection Agency (EPA) Regional Screening Level Table (November 2010) residential soil values and are based on a risk level of 1.0E-06 and a hazard index of 0.1.
[c] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = maximum detected concentration is less than the BSC.
(c) = essential nutrient.
(d) = frequency of detection is less than 5 percent.
[d] Y = Chemical is chosen as a COPC.
[e] 95% UCL (Upper confidence limit) determined using ProUCL Version 4.00.05 (EPA, 2010, ProUCL Version 4.00.05, Office of Research and Development, Las Vegas, Nevada, and Technology Support Center, Atlanta, GA, May, on line at http://www.epa.gov/esd/tsc/TSC_form.htm.
[f] Exposure point concentration (EPC) used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower. The EPC used to evaluate lead using the Lead Model (see text for details) is equal to the arithmetic mean.
[g] RBSC based on thallium from IRIS, 2009.
[h] RBSC based on acenaphthene.
[i] RBSC based on pyrene.
[j] RBSC based on 2-nitroaniline.

Table 2-7

Statistical Summary and Selection of Chemicals of Potential Concern in Bedrock Groundwater
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Arithmetic Mean µg/L	BSC [a] µg/L	RBSC [b] µg/L	COPC? [c,d]	EPC [e] µg/L
Inorganics - Unfiltered													
Aluminum	3 / 3	100	2.73E+01	J	2.43E+02	J	2.00E+02	2.00E+02	1.03E+02	3.09E+02	3700	N (a)	---
Arsenic	2 / 3	67	2.31E+01		1.29E+02		1.00E+01	1.00E+01	5.24E+01	7.40E+00	0.045	Y	1.29E+02
Barium	3 / 3	100	3.92E+02		1.12E+04		2.00E+02	8.00E+02	5.28E+03	1.18E+04	730	N (b)	---
Calcium	3 / 3	100	1.71E+05		2.96E+05	J	1.00E+03	1.00E+03	2.50E+05	3.16E+05	Nutrient	N (c)	---
Chromium	1 / 3	33	3.30E+00	J	3.30E+00	J	1.00E+01	1.00E+01	4.43E+00	NA	0.043	Y	3.30E+00
Copper	1 / 3	33	5.80E+00	J	5.80E+00	J	2.50E+01	2.50E+01	1.03E+01	1.98E+01	150	N (a)	---
Iron	1 / 3	33	2.60E+03		2.60E+03		3.00E+02	3.00E+02	9.67E+02	1.55E+03	2600	Y	2.60E+03
Magnesium	3 / 3	100	1.28E+05		2.13E+05		5.00E+03	5.00E+03	1.66E+05	2.17E+05	Nutrient	N (c)	---
Manganese	3 / 3	100	4.56E+01		8.60E+02		1.50E+01	1.50E+01	3.22E+02	6.36E+02	88	Y	8.60E+02
Nickel	2 / 3	67	3.80E+00	J	4.60E+00	J	4.00E+01	4.00E+01	9.47E+00	8.60E+00	73	N (a)	---
Potassium	3 / 3	100	6.81E+04		1.04E+05	J	1.00E+04	4.00E+04	8.93E+04	1.16E+05	Nutrient	N (c)	---
Selenium	2 / 3	67	3.40E+00	J	5.50E+00	J	1.00E+01	2.00E+01	4.63E+00	NA	18	N (a)	---
Sodium	3 / 3	100	7.10E+05		1.05E+06		1.00E+05	4.00E+05	9.33E+05	1.39E+06	Nutrient	N (c)	---
Vanadium	3 / 3	100	1.60E+00	J	2.50E+00	J	5.00E+01	5.00E+01	2.20E+00	NA	18	N (a)	---
Zinc	1 / 2 [f]	50	1.40E+01	J	1.40E+01	J	2.00E+01	2.00E+01	1.20E+01	5.01E+02	1100	N (a)	---
Semivolatile Organic Compounds													
3-Methylphenol and 4-Methylphenol	2 / 3	67	1.80E+00	J	4.60E+00	J	4.80E+00	2.10E+01	5.63E+00		93	N (a)	---
Dimethylphenol, 2,4-	1 / 3	33	1.50E+00	J	1.50E+00	J	4.80E+00	2.10E+01	4.92E+00		73	N (a)	---
Methylnaphthalene, 2-	3 / 3	100	6.90E+00		1.61E+01		4.80E+00	2.10E+01	1.15E+01		15	Y	1.61E+01
Methylphenol, 2-	3 / 3	100	1.23E+01		1.39E+01	J	4.80E+00	2.10E+01	1.30E+01		180	N (a)	---
Naphthalene	3 / 3	100	1.37E+01		1.95E+01		4.80E+00	2.10E+01	1.72E+01		0.14	Y	1.95E+01
Volatile Organic Compounds													
Acetone	2 / 2 [f]	100	5.02E+01	J	9.89E+01	J	5.00E+01	1.30E+02	7.46E+01		2200	N (a)	---
Benzene	3 / 3	100	5.60E+00		4.03E+02		2.00E+00	1.00E+01	1.43E+02		0.41	Y	4.03E+02
Butanone, 2-	2 / 3	67	1.19E+01		1.72E+02		1.00E+01	5.00E+01	6.55E+01		710	N (a)	---
Carbon disulfide	1 / 3	33	2.80E+00	J	2.80E+00	J	4.00E+00	2.00E+01	5.93E+00		100	N (a)	---
Chloroform	1 / 3	33	1.97E+01		1.97E+01		2.00E+00	1.00E+01	8.57E+00		0.19	Y	1.97E+01
Chloromethane	1 / 3	33	3.13E+01		3.13E+01		4.00E+00	2.00E+01	1.44E+01		19	Y	3.13E+01
Ethylbenzene	3 / 3	100	1.64E+01		1.72E+02		2.00E+00	1.00E+01	7.54E+01		1.5	Y	1.72E+02
Methylene chloride	1 / 3	33	1.29E+01	J	1.29E+01	J	1.00E+01	5.00E+01	1.01E+01		4.8	Y	1.29E+01
Tetrachloroethane, 1,1,2,2-	1 / 3	33	2.50E+00	J	2.50E+00	J	2.00E+00	1.00E+01	2.83E+00		0.067	Y	2.50E+00
Toluene	3 / 3	100	3.18E+01		5.30E+02		2.00E+00	1.00E+01	2.12E+02		230	Y	5.30E+02
Xylenes, total	2 / 2 [f]	100	6.25E+02		1.04E+03		1.50E+01	3.00E+01	8.33E+02		20	Y	1.04E+03
General Chemistry													
Chloride	3 / 3	100	1.07E+06		1.96E+06		1.00E+05	2.00E+05	1.63E+06		Nutrient	N (c)	---
Cyanide, total	1 / 3	33	4.20E+01	J	4.20E+01	J	1.00E+01	1.00E+01	1.73E+01		73	N (a)	---
Nitrate-Nitrite	3 / 3	100	1.90E+02		2.20E+03		1.00E+02	2.00E+03	1.11E+03		1000 [h]	Y	2.20E+03

Table 2-7

Statistical Summary and Selection of Chemicals of Potential Concern in Bedrock Groundwater
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Arithmetic Mean µg/L	BSC [a] µg/L	RBSC [b] µg/L		COPC? [c,d]	EPC [e] µg/L
Sulfate	2 / 3	67	1.43E+04		2.86E+04		2.00E+03	2.00E+05	4.76E+04		250,000	i	N (a)	---

µg/L - Micrograms per liter.
BSC - Background screening concentration.
COPC - Chemical of potential concern.
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.

[a] Shaw Environmental, Inc. (Shaw), 2005b, 2004 Groundwater Data Summary and Evaluation Report, Final, Former Plum Brook Ordnance Works, Sandusky, Ohio, April.
[b] Risk-Based Screening Concentrations based on U.S. Environmental Protection Agency (EPA) Regional Screening Level Table (November 2010) tap water values and are based on a risk level of 1.0E-06 and a hazard index of 0.1.
[c] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = maximum detected concentration is less than the BSC.
(c) = essential nutrient.
[d] Y = Chemical is chosen as a COPC.
[e] Exposure point concentration (EPC) used in risk assessment equal to maximum detected concentration.
[f] Some samples were excluded from the dataset because of blank contamination.
[g] Screening criteria for lead based on the action level of 15 µg/L (EPA, 2011, 2011 Edition of the the Drinking Water Standards and Health Advisories, Office of Water, Washington, DC, January, EPA 822-R-11-002).
[h] Because no Regional Screening Level exists for nitrate-nitrite, 0.1 X the nitrate-nitrite MCL (10 mg/L) is used for screening.
[i] Screening level based on the Secondary Drinking Water Regulation (EPA, 2011).

Table 2-8

Statistical Summary and Selection of Chemicals of Potential Concern in Overburden Monitoring Well Groundwater
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Arithmetic Mean µg/L	RBSC [a] µg/L	COPC? [b,c]	95% UCL [d] µg/L	EPC [e] µg/L
Inorganics-Unfiltered													
Aluminum	5 / 6	83	9.27E+01	J	1.01E+03	J	2.00E+02	2.00E+02	4.06E+02	3700	N (a)		---
Arsenic	2 / 6	33	7.20E+00	J	7.70E+00	J	1.00E+01	1.00E+01	5.82E+00	0.045	Y	6.90E+00	6.90E+00
Barium	6 / 6	100	6.60E+01	J	1.61E+02	J	2.00E+02	2.00E+02	1.06E+02	730	N (a)		---
Calcium	6 / 6	100	2.89E+04		8.76E+04		1.00E+03	1.00E+03	4.82E+04	Nutrient	N (b)		---
Cobalt	1 / 6	17	1.10E+00	J	1.10E+00	J	5.00E+01	5.00E+01	2.10E+01	1.1	Y	NA	1.10E+00
Copper	2 / 6	33	5.90E+00	J	8.40E+00	J	2.50E+01	2.50E+01	1.07E+01	150	N (a)		---
Iron	5 / 6	83	1.23E+02	J	1.69E+03		3.00E+02	3.00E+02	6.47E+02	2600	N (a)		---
Lead	1 / 3 [f]	33	2.80E+00	J	2.80E+00	J	5.00E+00	5.00E+00	2.60E+00	15 [g]	N (a)		---
Magnesium	6 / 6	100	8.56E+03		2.26E+04		5.00E+03	5.00E+03	1.39E+04	Nutrient	N (b)		---
Manganese	6 / 6	100	3.95E+01		5.64E+02		1.50E+01	1.50E+01	2.17E+02	88	Y	3.89E+02	3.89E+02
Mercury	1 / 6	17	1.50E-01	J	1.50E-01	J	1.00E+00	1.00E+00	4.42E-01	1.1	N (a)		---
Nickel	4 / 6	67	2.90E+00	J	4.50E+00	J	4.00E+01	4.00E+01	8.97E+00	73	N (a)		---
Potassium	6 / 6	100	4.36E+03	J	1.85E+04		1.00E+04	1.00E+04	9.72E+03	Nutrient	N (b)		---
Selenium	2 / 6	33	6.90E+00	J	7.40E+00	J	1.00E+01	2.00E+01	6.55E+00	18	N (a)		---
Sodium	6 / 6	100	1.68E+04		1.18E+05		1.00E+04	2.00E+04	7.81E+04	Nutrient	N (b)		---
Vanadium	4 / 6	67	2.00E+00	J	4.20E+00	J	5.00E+01	5.00E+01	1.02E+01	18	N (a)		---
Zinc	1 / 3 [f]	33	1.11E+01	J	1.11E+01	J	2.00E+01	2.00E+01	1.04E+01	1100	N (a)		---
Explosives													
Amino-2,6-dinitrotoluene, 4-	2 / 6	33	1.40E-01	J	1.30E+00		1.90E-01	2.00E-01	3.03E-01	7.3	N (a)		---
Amino-4,6-dinitrotoluene, 2-	1 / 6	17	2.20E+00		2.20E+00		1.90E-01	2.00E-01	4.47E-01	7.3	N (a)		---
Dinitrobenzene, 1,3-	1 / 6	17	1.20E-01	J	1.20E-01	J	1.90E-01	2.00E-01	1.00E-01	0.37	N (a)		---
Dinitrotoluene, 2,4-	3 / 6	50	2.00E-01		1.70E+00		1.90E-01	2.00E-01	4.28E-01	0.099	Y	1.03E+00	1.03E+00
Dinitrotoluene, 2,6-	3 / 6	50	2.00E-01		1.70E+00		1.90E-01	2.00E-01	4.32E-01	0.099	Y	1.04E+00	1.04E+00
Trinitrotoluene, 2,4,6-	1 / 6	17	1.70E+00		1.70E+00		1.90E-01	2.00E-01	3.63E-01	1.8	N (a)		---
Semivolatile Organic Compounds													
Bis(2-ethylhexyl)phthalate	1 / 6	17	6.50E+00		6.50E+00		4.80E+00	5.10E+00	3.11E+00	4.8	Y	4.48E+00	4.48E+00
Volatile Organic Compounds													
Acetone	1 / 5 [f]	20	4.92E+01	J	4.92E+01	J	2.50E+01	2.50E+01	1.98E+01	2200	N (a)		---
Butanone, 2-	1 / 6	17	1.75E+01		1.75E+01		5.00E+00	5.00E+00	5.00E+00	710	N (a)		---
Carbon disulfide	1 / 6	17	1.20E+00	J	1.20E+00	J	2.00E+00	2.00E+00	1.03E+00	100	N (a)		---
General Chemistry													
Chloride	6 / 6	100	4.60E+03		2.58E+04		2.00E+03	2.00E+03	1.04E+04	Nutrient	N (b)		---
Cyanide, total	3 / 6	50	1.10E+01	J	2.60E+01	J	1.00E+01	1.00E+01	1.17E+01	73	N (a)		---
Nitrate-Nitrite	2 / 6	33	4.80E+01	J	1.40E+02		1.00E+02	2.00E+03	2.23E+02	1000 [h]	N (a)		---
Sulfate	6 / 6	100	3.58E+04		9.33E+04		2.00E+03	4.00E+03	6.42E+04	250,000 [i]	N (a)		---

µg/L - Micrograms per liter.
COPC - Chemical of potential concern.
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.

Table 2-8

Statistical Summary and Selection of Chemicals of Potential Concern in Overburden Monitoring Well Groundwater
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

[a] Risk-Based Screening Concentrations based on U.S. Environmental Protection Agency (EPA) Regional Screening Level Table (November 2010) tap water values and are based on a risk level of 1.0E-06 and a hazard index of 0.1.

[b] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = essential nutrient.

[c] Y = Chemical is chosen as a COPC.

[d] 95% UCL (Upper confidence limit) determined using ProUCL Version 4.00.05 (U.S. Environmental Protection Agency (EPA), 2010, Office of Research and Development, Las Vegas, Nevada, and Technology Support Center, Atlanta, GA, May, on line at http://www.epa.gov/esd/tsc/TSC_form.htm. Calculated only for COPC.

[e] Exposure point concentration (EPC) used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower.

[f] Some samples were excluded from the dataset because of blank contamination.

[g] Screening criteria for lead based on the action level of 15 µg/L (EPA, 2011, 2011 Edition of the the Drinking Water Standards and Health Advisories, Office of Water, Washington, DC, January, EPA 822-R-11-002).

[h] Because no Regional Screening Level exists for nitrate-nitrite, 0.1 X the nitrate-nitrite MCL (10 mg/L) is used for screening.

i Screening level based on the Secondary Drinking Water Regulation (EPA, 2011).

Table 2-9

Statistical Summary and Selection of Chemicals of Potential Concern in Sediment
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	RBSC [a] mg/kg	COPC? [b,c]	EPC [d] mg/kg
Inorganics												
Aluminum	4 / 4	100	3.70E+00		1.22E+01		1.20E+00	1.30E+00	8.14E+00	7.70E+04	N (a)	---
Barium	3 / 4	75	2.55E+01	/U	4.74E+01		2.38E+01	2.58E+01	2.84E+01	1.50E+04	N (a)	---
Cadmium	1 / 4	25	2.60E-01		2.60E-01		2.35E-01	2.60E-01	1.56E-01	7.00E+01	N (a)	---
Chromium	4 / 4	100	8.20E+00		1.40E+01		5.95E-01	6.40E-01	1.24E+01	2.90E-01	Y	1.40E+01
Lead	4 / 4	100	2.80E+00		8.90E+00		3.55E-01	3.90E-01	6.31E+00	4.00E+02	N (a)	---
Selenium	2 / 4	50	7.30E-01		8.50E-01		5.95E-01	6.40E-01	5.47E-01	3.90E+02	N (a)	---

COPC - Chemical of potential concern.
mg/kg - Milligrams per kilogram.
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
/ - When in the VQ column, this separates two qualifiers from field duplicate samples, where the concentration is the averaged field duplicate concentrations.
U - The sample result was nondetect.

[a] Risk-Based Screening Concentrations based on U.S. Environmental Protection Agency (EPA) Regional Screening Level Table (November 2010) residential soil and are based on a risk level of 1.0E-06 and a hazard index of 1.
[b] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = essential nutrient.
[c] Y = Chemical is chosen as a COPC.
[d] Exposure point concentration (EPC) used in risk assessment equal to maximum detected concentration.

Table 2-10

Statistical Summary and Selection of Chemicals of Potential Concern in Surface Water
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Conc Minimum	VQ	Detected Conc Maximum	VQ	Reporting Limits Minimum	Reporting Limits Maximum	Arithmetic Mean µg/L	RBSC [a] µg/L	COPC? [b,c]
Metals											
Aluminum	1 / 1	100	66.5	J	66.5	J	200	200	6.65E+01	3.70E+04	N (a)
Barium	1 / 1	100	37.9	J	37.9	J	200	200	3.79E+01	7.30E+03	N (a)
Calcium	1 / 1	100	102000		102000		1000	1000	1.02E+05	Nutrient	N (b)
Iron	1 / 1	100	5330		5330		300	300	5.33E+03	2.60E+04	N (a)
Magnesium	1 / 1	100	18100		18100		5000	5000	1.81E+04	Nutrient	N (b)
Manganese	1 / 1	100	534		534		15	15	5.34E+02	8.80E+02	N (a)
Potassium	1 / 1	100	3490	J	3490	J	20000	20000	3.49E+03	Nutrient	N (b)
Selenium	1 / 1	100	3.8	J	3.8	J	10	10	3.80E+00	1.80E+02	N (a)
Sodium	1 / 1	100	38900		38900		10000	10000	3.89E+04	Nutrient	N (b)
Semivolatile Organic Compounds											
3-Methylphenol and 4-Methylphenol	1 / 1	100	4.7	J	4.7	J	4.8	4.8	4.70E+00	9.30E+02	N (a)
Phenol	1 / 1	100	2.8	J	2.8	J	4.8	4.8	2.80E+00	1.10E+04	N (a)

µg/L - Micrograms per liter.
COPC - Chemical of potential concern.
RBSC - Risk-based screening concentration.
VQ - Validation qualifier.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.

[a] Risk-Based Screening Concentrations based on USEPA Regional Screening Level Table (November 2010) tap water values are based on a risk level of 1.0E-06 and a hazard index of 1.
[b] N = Chemical is not chosen as a COPC:
(a) = maximum detected concentration is less than the RBSC.
(b) = essential nutrient.
[c] Y = Chemical is chosen as a COPC.

Table 3-1

Receptor/Exposure Scenarios
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Source Medium	Model	Exposure Medium	Exposure Route
Groundskeeper – Current			
Surface Soil	None	Soil	Incidental Ingestion
			Dermal Contact
	Dust Emissions Based on Activity	Ambient Air	Inhalation
	Volatilization from Soil	Ambient Air	Inhalation[a]
Subsurface Soil	Not Quantified[b]		
Groundwater	Not Quantified[c]		
Surface Water	Not Quantified[b]		
Sediment	Not Quantified[b]		
Groundskeeper – Future			
Total Soil[d]	None	Soil	Incidental Ingestion
			Dermal Contact
	Dust Emissions Based on Activity	Ambient Air	Inhalation
	Volatilization from Soil	Ambient Air	Inhalation
Groundwater	None	Tap Water	Ingestion
			Dermal Contact
Surface Water	Not Quantified[b]		
Sediment	Not Quantified[b]		
Indoor Worker – Future[c]			
Surface Soil	None	Soil	Incidental Ingestion
			Dermal Contact[a]
	Dust Emissions; Volatilization	Indoor Air	Inhalation[a]
Subsurface Soil	Volatilization from Soil	Indoor Air	Inhalation
Groundwater	None	Tap Water	Ingestion
			Dermal Contact
Surface Water	Not Quantified[b]		
Sediment	Not Quantified[b]		

Table 3-1

Receptor/Exposure Scenarios
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Source Medium	Model	Exposure Medium	Exposure Route
Construction Worker – Current/Future			
Total Soil	None	Soil	Incidental Ingestion
			Dermal Contact
	Dust Emissions Based on Activity	Ambient Air	Inhalation
	Volatilization from Soil	Ambient Air	Inhalation
Groundwater	Not Quantified[b]		
Surface Water	None	Surface Water	Dermal Contact
	Volatilization from Water	Ambient Air	Inhalation[a]
Sediment	None	Sediment	Incidental Ingestion
			Dermal Contact
On-Site Resident – Future			
Total Soil[d]	None	Soil	Incidental Ingestion
			Dermal Contact
	Dust Emissions Based on Wind Erosion	Ambient Air	Inhalation
	Volatilization from Soil	Ambient Air	Inhalation
Subsurface Soil	Volatilization from Soil	Indoor Air	Inhalation
Groundwater	None	Tap Water	Ingestion
			Dermal Contact
	Volatilization from Water	Indoor Air	Inhalation
Surface Water	None	Surface Water	Dermal Contact
	Volatilization from Water	Ambient Air	Inhalation[a]
Sediment	None	Sediment	Incidental Ingestion
			Dermal Contact

Table 3-1

Receptor/Exposure Scenarios
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Source Medium	Model	Exposure Medium	Exposure Route
Hunter – Current/Future			
Surface Soil	None	Soil	Incidental Ingestion
			Dermal Contact
	Dust Emissions, Volatilization	Ambient Air	Inhalation[a]
	Biouptake	Venison	Venison Consumption
Subsurface Soil	Not Quantified[e]		
Surface Water	Not Quantified[b]		
Sediment	Not Quantified[b]		
Hunter's Child – Current/Future			
Surface Soil	Not Quantified[e]		
	Not Quantified[e]		
	Biouptake	Venison	Venison Consumption
Subsurface Soil	Not Quantified[e]		
Surface Water	Not Quantified[e]		
Sediment	Not Quantified[e]		

[a] Although theoretically complete, this pathway is not quantified as explained in text.

[b] Although contact with this medium is possible, exposure would be sporadic, rather than continuous or predictable. Such exposures do not lend themselves to evaluation under the chronic toxicity paradigm used in a baseline risk assessment.

[c] Even though the mixing of surface and subsurface soil described in footnote "d" might otherwise be applicable, this receptor was selected primarily to evaluate exposure to indoor air resulting from subsurface soil contamination. Surface soil was used for direct contact exposure to avoid potential "double counting" of contaminants in subsurface soil (refer to Section 3.1.3.2 of text).

[d] Total soil represents a mixture of surface and subsurface soil. This is assumed for future scenarios where excavation and regrading is assumed to take place.

[e] There is no plausible pathway for exposure.

Table 3-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Pathway Variable	Grounds-keeper	Construction Worker	On-Site Resident	Indoor Worker	Hunter and Hunter's Child
General Variables Used in All Intake Models					
Body weight (BW), kg	70[a]	70[a]	Child: 15[a] Adult: 70[a]	70[a]	Child: 15[a] Adult: 70[a]
Averaging time, noncancer (AT), days[b]	9125	183	Child: 2190 Adult: 8760	9125	Child: 2190 Adult: 10950
Averaging time, cancer (AT), days[b]	25550	25550	25550	25550	25550
Inhalation of VOCs and Resuspended Dust from Surface Soil, Total Soil or Subsurface Soil					
Fraction exposed to contaminated medium (FI_a), unitless	1[c]	1[c]	1[c]	NA	NA
Inhalation rate (IR_a), m^3/day	20[d]	20[d]	Child: 10[e] Adult: 20[d]	NA	NA
Exposure frequency (EF), days/year	250[d]	250[f]	350[a]	NA	NA
Exposure duration (ED), years	25[a]	0.5[f]	Child: 6[a] Adult: 24[a]	NA	NA
Inhalation of VOCs in Indoor Air from Subsurface Soil					
Fraction exposed to contaminated medium (FI_a), unitless	NA	NA	1[c]	1[c]	NA
Inhalation rate (IR_a), m^3/day	NA	NA	Child: 10[e] Adult: 20[d]	20[d]	NA
Exposure frequency (EF), days/year	NA	NA	350[a]	250[a]	NA
Exposure duration (ED), years	NA	NA	Child: 6[a] Adult: 24[a]	25[a]	NA
Incidental Ingestion of Soil					
Fraction exposed to contaminated medium (FI_{so}), unitless	1[c]	1[c]	0.9[g]	1[c]	1[c]

Table 3-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Pathway Variable	Grounds-keeper	Construction Worker	On-Site Resident	Indoor Worker	Hunter and Hunter's Child
Soil incidental ingestion rate (IR_{so}), mg/day	100[a]	330[a]	Child: 200[a] Adult: 100[a]	50[a]	Child: NA Adult: 100[a]
Exposure frequency (EF), days/year	250[d]	250[a]	350[a]	250[a]	14[d]
Exposure duration (ED), years	25[a]	0.5[f]	Child: 6[a] Adult: 24[a]	25[a]	30[a]
Dermal Contact with Soil					
Fraction exposed to contaminated medium (FI_{so}), unitless	1[c]	1[c]	1[c]	NA	1[c]
Body surface area exposed to soil (SA_{so}), cm^2	3,300[h]	3,300[h]	Child: 2,800[h] Adult: 5,700[h]	NA	Child: NA Adult: 3,300[h,i]
Soil-to-skin adherence factor (AF_{so}), mg/cm^2	0.2[h]	0.3[h]	Child: 0.2[h] Adult: 0.07[h]	NA	0.2[h,i]
Dermal absorption factor (ABS), unitless	csv	csv	csv	NA	csv
Exposure frequency (EF), days/year	250[d]	250[a]	350[a]	NA	14[i]
Exposure duration (ED), years	25[a]	0.5[f]	Child: 6[a] Adult: 24[a]	NA	30[a]
Inhalation of VOCs from Groundwater					
Exposure time (ET), hours/day	NA	NA	24[j]	NA	NA
Inhalation rate (IR_a), m^3/hour	NA	NA	Child: 0.416[e] Adult: 0.833[e]	NA	NA
Exposure frequency (EF), days/year	250[d]	NA	350[a]	250[a]	NA

Table 3-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Pathway Variable	Grounds-keeper	Construction Worker	On-Site Resident	Indoor Worker	Hunter and Hunter's Child
Drinking Water Ingestion of Groundwater					
Fraction exposed to contaminated medium (FI_{gw}), unitless	1[c]	NA	1[c]	1[c]	NA
Drinking water ingestion rate (IR_{gw}), L/day	1[d]	NA	Child: 1[e] Adult: 2[d]	1[d]	NA
Exposure frequency (EF), days/year	250[d]	NA	350[a]	250[a]	NA
Dermal Contact with Groundwater					
Fraction exposed to contaminated medium (FI_{gw}), unitless	1[c]	NA	1[c]	1[c]	NA
Body surface area exposed to water (SA_{gw}), cm^2	3,300[h,k]	NA	Child: 6,600[l] Adult: 20,000[l]	3,300[l]	NA
Permeability coefficient (PC), cm/hour	csv	NA	csv	csv	NA
Exposure time (ET_{gw}), hours/day	1[c]	NA	Child: 0.333[l] Adult: 0.2[l]	1[c]	NA
Exposure frequency (EF), days/year	250[d]	NA	350[d]	250[a]	NA
Incidental Ingestion of Sediment					
Fraction exposed to contaminated medium (FI_{sd}), unitless	NA	1[c]	0.1[g]	NA	NA
Sediment incidental ingestion rate (IR_{sd}), mg/day	NA	330[a]	Child: 200[a] Adult: 100[a]	NA	NA
Exposure frequency (EF), days/year	NA	250[f]	350[a]	NA	NA
Exposure duration (ED), years	NA	0.5[f]	Child: 6[a] Adult: 24[a]	NA	NA

Table 3-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Pathway Variable	Grounds-keeper	Construction Worker	On-Site Resident	Indoor Worker	Hunter and Hunter's Child
Dermal Contact with Sediment					
Fraction exposed to contaminated medium (FI_{sd}), unitless	NA	1[f]	0.1[g]	NA	NA
Body surface area exposed to sediment (SA_{sd}), cm^2	NA	3,300[h]	Child: 2,800[h] Adult: 5,700[h]	NA	NA
Sediment-to-skin adherence factor (AF_{sd}), mg/cm^2	NA	0.3[h]	Child: 0.2[h] Adult: 0.07[h]	NA	NA
Dermal absorption factor (ABS), unitless	NA	csv	csv	NA	NA
Exposure frequency (EF), days/year	NA	250[f]	52[m]	NA	NA
Exposure duration (ED), years	NA	0.5[f]	Child: 6[a] Adult: 24[a]	NA	NA
Dermal Contact with Surface Water					
Body surface area exposed to surface water (SA_{sw}), cm^2	NA	3,300[n]	Child: 2,800[n] Adult: 7,000[o]	NA	NA
Permeability coefficient (PC), cm/hour	NA	csv	csv	NA	NA
Exposure time (ET_{sw}), hour/day	NA	4[f]	3[m]	NA	NA
Exposure frequency (EF), days/year	NA	250[f]	52[m]	NA	NA
Exposure duration (ED), years	NA	0.5[f]	Child: 6[a] Adult: 24[a]	NA	NA
Venison Consumption					
Venison ingestion rate (IR_v), kg/day	NA	NA	NA	NA	Child: 0.005[i] Adult: 0.013[p]
Exposure frequency (EF), days/year	NA	NA	NA	NA	350[a]

Table 3-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Pathway Variable	Grounds-keeper	Construction Worker	On-Site Resident	Indoor Worker	Hunter and Hunter's Child
Exposure duration (ED), years	NA	NA	NA	NA	Child: 6[a] Adult: 30[q]

Note: Groundwater pathways are quantified only for Ash Pit 1 because no groundwater samples could be collected at Ash Pit 3 (see Section 2.1 of text).

[a] U.S. Environmental Protection Agency (EPA), 2002, *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*, Office of Solid Waste and Emergency Response, Washington, DC, 9355.4-24, December.

[b] For noncancer evaluation, calculated as the product of ED (years) x 365 days/year; for cancer evaluation, calculated as the product of 70 years (assumed human lifetime) x 365 days/year. Source: U.S. Environmental Protection Agency (EPA), 1989a, *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002.

[c] Default value which assumes 100 percent of exposure is to contaminated medium.

[d] U.S. Environmental Protection Agency (EPA), 1991, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance, Standard Default Exposure Factors*, Interim Final, Office of Solid Waste and Emergency Response, OSWER Directive: 9285.603.

[e] U.S. Environmental Protection Agency (EPA), 2004a, *User's Guide and Background Technical Document for Region 9 Preliminary Remediation Goals (PRG) Table*, Region 9, San Francisco, California, October, <http://www.epa.gov/region09/waste/sfund /prg/files/04usersguide.pdf>.

[f] Assumed; see Section 3.1.3.4 of text for explanation.

[g] It is assumed that on days when the resident is visiting the ditches and is exposed to sediment that half of the daily exposure via dermal contact and ingestion are associated with ditch sediment (sediment FI=0.5) and half of the exposure is associated with soil (soil FI=0.5). The resident is assumed to be exposed to soil 350 days/year and to sediment 52 days/year. The FI values of 0.1 for sediment and 0.9 for soil are weighted average daily values as described in Section 3.1.3.4 of the text.

[h] U.S. Environmental Protection Agency (EPA), 2004b, *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)*, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

[i] Please see Section 3.1.3.7 of text for detailed explanation.

[j] The *Exposure Factors Handbook* (see reference h) indicates that the 90th percentile for the amount of time spent at a residence is more than 23 hours per day.

[k] Please see Section 3.1.3.2 of text for detailed explanation.

Table 3-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

[l] U.S. Environmental Protection Agency (EPA), 1997, *Exposure Factors Handbook*, Final, National Center for Environmental Assessment, Washington, D.C., EPA/600/P-95/002Fa, August.
[m] Assumed; please see Section 3.1.3.5 of text for detailed explanation.
[n] Value for dermal soil exposure (EPA, 2004b) was selected as appropriate for exposure to this medium by this receptor; refer to Section 3.1.3.5 of text for detail.
[o] Value based on the Exposure Factors Handbook (EPA, 1997). See Section 3.1.3.5 of the text for detailed explanation.
[p] Please see Section 3.1.3.5 of the text for detailed explanation.
[q] Assumes deer are hunted for a 30-year duration.

csv – Chemical-specific value.
NA – Pathway not applicable for receptor.

Table 3-3

Physical Properties of Site-Related Chemicals[a]
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical of Potential Concern	Soil-to-forage Biotransfer Factor B_p (unitless)	Biotransfer Factor for Beef B_b (days/kg)	Biotransfer Factor for Venison B_v (unitless)	Diffusivity In Air (D_i) (cm^2/second)	Soil Organic Carbon-Water Partition Coefficient K_{oc} (cm^3/g)	log K_{ow}	Absorption Fraction ABS (unitless)	Permeability Coefficient K_p (cm/hour)	*tau* (hour/event)	*t** (hour)	Fraction Absorbed from Water FA (unitless)	B (unitless)	Molecular Weight (g/mole)	Henry's Law Constant (atm-m^3/mole)
Metals														
Arsenic	NA	NA	NA	NA	2.90E+01	NA	0.03	1.00E-03	NA	NA	NA	NA	74.92	NA
Chromium III	NA	NA	NA	NA	1.80E+06	NA	NA	1.00E-03	NA	NA	NA	NA	52	NA
Chromium VI	NA	NA	NA	NA	1.90E+01	NA	NA	2.00E-03	NA	NA	NA	NA	52	NA
Chromium, Total	NA	NA	NA	NA	NA	NA	NA	1.00E-03	NA	NA	NA	NA	52	NA
Cobalt	NA	NA	NA	NA	4.50E+01	NA	NA	4.00E-04	NA	NA	NA	NA	58.93	NA
Iron	NA	NA	NA	NA	2.50E+01	NA	NA	1.00E-03	NA	NA	NA	NA	55.845	NA
Manganese	NA	NA	NA	NA	6.50E+01	NA	NA	1.00E-03	NA	NA	NA	NA	54.94	NA
Vanadium	NA	NA	NA	NA	1.55E+02	NA	0	1.00E-03	NA	NA	NA	NA	50.94	NA
Pesticides and PCBs														
Aroclor 1254	6.78E-03	7.94E-02	4.76E-04	3.99E-02	1.00E+05	6.79E+00	0.14	4.30E-01	11.3	47.9	0.5	3.2	326.4	2.83E-04
Nitroaromatics														
Dinitrobenzene, 1,3-	NA	NA	NA	6.24E-02	1.54E+02	1.49E+00	0.1	1.75E-03	0.917	2.2	1	0	168.11	4.90E-08
Dinitrotoluene, 2,4-	NA	NA	NA	2.03E-01	9.55E+01	1.98E+00	0.102	3.10E-03	1.12	2.69	1	0	182.1	5.40E-08
Dinitrotoluene, 2,6-	NA	NA	NA	5.91E-02	4.57E+01	1.72E+00	0.099	2.10E-03	1.12	2.69	1	0	182.1	7.47E-07
Trinitrotoluene, 2,4,6-	NA	NA	NA	5.10E-02	1.77E+02	1.60E+00	0.032	9.64E-04	1.96	4.71	1	0	227.13	2.08E-08
Semivolatile Organic Compounds														
Benzo(a)anthracene	NA	NA	NA	5.10E-02	3.98E+05	5.66E+00	0.13	4.70E-01	2.03	8.53	1	2.8	228.3	3.34E-06
Benzo(a)pyrene	NA	NA	NA	4.30E-02	1.02E+06	6.10E+00	0.13	7.00E-01	2.69	11.67	1	4.3	252.3	4.57E-07
Benzo(b)fluoranthene	NA	NA	NA	2.26E-02	1.23E+06	6.12E+00	0.13	7.00E-01	2.77	12.03	1	4.3	252.3	6.57E-07
Bis(2-ethylhexyl)phthalate	NA	NA	NA	3.51E-02	9.94E+04	7.60E+00	0.004	2.50E-02	16.64	39.93	0.8	0.2	391	2.70E-07
Indeno(1,2,3-cd)pyrene	NA	NA	NA	1.90E-02	3.47E+06	6.58E+00	0.13	1.00E+00	3.78	16.83	0.6	6.7	276.3	1.60E-06
Methylnaphthalene, 2-	NA	NA	NA	6.97E-02	3.98E+03	3.86E+00	0.13	8.94E-02	0.657	1.58	1	0.41	142.2	5.18E-04
Naphthalene	NA	NA	NA	5.90E-02	2.00E+03	3.30E+00	0.13	4.70E-02	0.56	1.34	1	0.2	128.2	4.40E-04
Volatile Organic Compounds														
Benzene	NA	NA	NA	8.80E-02	5.89E+01	2.13E+00	NA	1.50E-02	0.29	0.7	1	0.1	78.1	5.55E-03
Chloroform	NA	NA	NA	1.04E-01	3.98E+01	1.97E+00	NA	6.80E-03	0.5	1.19	1	0	119.4	3.67E-03
Chloromethane (Methyl Chloride)	NA	NA	NA	1.39E-01	1.41E+01	9.10E-01	NA	3.30E-03	0.2	0.49	1	0	50.5	8.82E-03
Ethylbenzene	NA	NA	NA	7.50E-02	3.63E+02	3.15E+00	NA	4.90E-02	0.42	1.01	1	0.2	106.2	7.88E-03
Methylene chloride	NA	NA	NA	1.01E-01	1.17E+01	1.25E+00	NA	3.50E-03	0.32	0.76	1	0	84.9	3.25E-03
Tetrachloroethane, 1,1,2,2-	NA	NA	NA	7.10E-02	9.33E+01	2.39E+00	NA	6.90E-03	0.93	2.24	1	0	167.9	3.67E-04
Toluene	NA	NA	NA	8.70E-02	1.82E+02	2.73E+00	NA	3.10E-02	0.35	0.84	1	0.1	92.1	6.64E-03
Xylenes	NA	NA	NA	7.00E-02	4.07E+02	3.20E+00	NA	5.30E-02	0.42	1.01	1	0.2	106.2	5.18E-03
General Chemistry														
Nitrate-Nitrite	3.00E+01	NA	NA	NA	NA	NA	NA	1.00E-03	NA	NA	NA	NA	NA	NA

tau - Lag time associated with rate at which chemical crosses stratum corneum per event.
t* - Time for absorption across the stratum corneum to reach steady state ; equals 2.4 times tau.
B - Ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis
kg - Kilogram.
cm - Centimeter(s).
g - Gram.
atm-m^3 - Atmospheres per cubic meter.

[a] See Appendix C which provides references for these values.

Table 4-1

Summary of Toxicity Assessment [a]
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical of Potential Concern	GAF	Weight of Evidence	Oral Slope Factor (mg/kg-day) $^{-1}$	Dermal Slope Factor (mg/kg-day) $^{-1}$	Weight of Evidence	Inhalation Unit Risk (µg/m^3) $^{-1}$	Inhalation Slope Factor (mg/kg-day) $^{-1}$
Metals							
Arsenic	1	A	1.5E+00	1.5E+00	A	4.3E-03	1.5E+01
Chromium III	0.013	D	NA	NA	D	NA	NA
Chromium VI	0.025	D	NA	NA	A	1.2E-02	4.2E+01
Chromium, Total	0.013	D	NA	NA	A	1.2E-02	4.2E+01
Cobalt	1	ND	NA	NA	B	9.0E-04	3.2E+01
Iron	1	ND	NA	NA	ND	NA	NA
Manganese	0.04	D	NA	NA	D	NA	NA
Vanadium	0.026	NA	NA	NA	NA	NA	NA
Pesticides and PCBs							
Aroclor 1254	1	B2	2.0E+00	2.0E+00	B2	5.7E-04	2.0E+00
Nitroaromatics							
Dinitrobenzene, 1,3-	1	D	NA	NA	D	NA	NA
Dinitrotoluene, 2,4-	1	B2	6.8E-01	6.8E-01	D	NA	NA
Dinitrotoluene, 2,6-	1	B2	6.8E-01	6.8E-01	D	NA	NA
Trinitrotoluene, 2,4,6-	1	C	3.0E-02	3.0E-02	C	NA	NA
Semivolatile Organic Compounds							
Benzo(a)anthracene	1	B2	7.3E-01	7.3E-01	B2	8.8E-05	3.1E-01
Benzo(a)pyrene	1	B2	7.3E+00	7.3E+00	B2	8.8E-04	3.1E+00
Benzo(b)fluoranthene	1	B2	7.3E-01	7.3E-01	B2	8.8E-05	3.1E-01
Bis(2-ethylhexyl)phthalate	1	B2	1.4E-02	1.4E-02	B2	2.4E-06	8.4E-03
Indeno(1,2,3-cd)pyrene	1	B2	7.3E-01	7.3E-01	B2	8.8E-05	3.1E-01
Methylnaphthalene, 2-	1	D	NA	NA	D	NA	NA
Naphthalene	1	C	ND	NA	C	3.4E-05	1.2E-01
Volatile Organic Compounds							
Benzene	1	A	5.5E-02	5.5E-02	A	7.8E-06	2.7E-02
Chloroform	1	B2	NC	NA	B2	ND	NC
Chloromethane (Methyl Chloride)	1	D	NA	NA	D	NA	NA
Ethylbenzene	1	D	NA	NA	D	NA	NA
Methylene chloride	1	B2	7.5E-03	7.5E-03	B2	4.7E-07	1.6E-03
Tetrachloroethane, 1,1,2,2-	1	C	2.0E-01	2.0E-01	C	ND	NA
Toluene	1	D	NA	NA	D	NA	NA
Xylenes	1	D	NA	NA	D	NA	NA
General Chemistry							
Nitrate-Nitrite	NA	ND	NA	NA	NA	NA	NA

Table 4-1

Summary of Toxicity Assessment [a]
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

mg/kg-day - Milligrams per kilogram per day.
$(mg/kg\text{-}day)^{-1}$ - Additional lifetime cancer risk per daily dose of 1 mg/kg-day.
$\mu g/m^3$ - Milligrams per cubic meter.
$(\mu g/m^3)^{-1}$ - Additional lifetime cancer risk at exposure concentration of 1 $\mu g/m^3$.
GAF - Gastrointestinal absorption factor.
NA - Not available or not applicable.
ND - No data or not determined.
NC - Noncancer value is regarded as protective of cancer effects in the Integrated Risk Information System (IRIS) evaluation (U.S. Environmental Protection Agency [EPA], 2011).
[a] See Appendix C which provides references for these values.

Weight of Evidence (WOE) EPA Group:
A - Carcinogenic to humans
B - Likely to be carcinogenic to humans (includes both the former B1 and B2 probable human carcinogens as classified on IRIS)
C - Suggested evidence of carcinogenic potential
D - Inadequate evidence to assess carcinogenic potential

Table 4-1

Summary of Toxicity Assessment [a]
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

		Oral		Dermal	Reference	Inhalation	
Chemical of Potential Concern	GAF	Reference Dose mg/kg-day	Target Organs	Reference Dose mg/kg-day	Concentration mg/m^3	Reference Dose mg/kg-day	Target Organs
Metals							
Arsenic	1	3.0E-04	S	3.0E-04	NA	NA	NA
Chromium III	0.013	1.5E+00	ND	2.0E-02	NA	NA	NA
Chromium VI	0.025	3.0E-03	ND	7.5E-05	1.0E-04	2.9E-05	Lung
Chromium, Total	0.013	2.1E-02	ND	2.7E-04	7.0E-04	2.0E-04	Lung
Cobalt	1	3.0E-04	Thyroid	3.0E-04	6.0E-06	1.7E-06	RT
Iron	1	7.0E-01	GI	NA	ND	NA	NA
Manganese	0.04	4.7E-02	CNS	1.9E-03	5.0E-05	1.4E-05	CNS
Vanadium	0.026	5.0E-03	Hair	1.3E-04	ND	NA	NA
Pesticides and PCBs							
Aroclor 1254	1	2.0E-05	IS	2.0E-05	ND	NA	NA
Nitroaromatics							
Dinitrobenzene, 1,3-	1	1.00E-04	E, Sp	1.00E-04	ND	NA	NA
Dinitrotoluene, 2,4-	1	2.0E-03	CNS,E,L	2.0E-03	ND	NA	NA
Dinitrotoluene, 2,6-	1	1.0E-03	CNS,E,L	1.0E-03	ND	NA	NA
Trinitrotoluene, 2,4,6-	1	5.0E-04	L	5.0E-04	ND	NA	NA
Semivolatile Organic Compounds							
Benzo(a)anthracene	1	ND	NA	NA	ND	NA	NA
Benzo(a)pyrene	1	ND	NA	NA	ND	NA	NA
Benzo(b)fluoranthene	1	ND	NA	NA	ND	NA	NA
Bis(2-ethylhexyl)phthalate	1	2.0E-02	L	2.0E-02	ND	NA	NA
Indeno(1,2,3-cd)pyrene	1	ND	NA	NA	ND	NA	NA
Methylnaphthalene, 2-	1	4.0E-03	RT	4.0E-03	ND	NA	NA
Naphthalene	1	2.0E-02	RB/OW	2.0E-02	3.0E-03	8.6E-04	RT
Volatile Organic Compounds							
Benzene	1	4.0E-03	IS	4.0E-03	3.0E-03	8.6E-03	BC
Chloroform	1	1.0E-02	L	1.0E-02	5.0E-02	1.4E-02	L,K
Chloromethane (Methyl Chloride)	1	ND	NA	NA	9.0E-02	2.6E-02	CNS
Ethylbenzene	1	1.0E-01	L,K	1.0E-01	1.0E+00	2.9E-01	F
Methylene chloride	1	6.0E-02	L	6.0E-02	1.0E+00	3.0E-01	NA
Tetrachloroethane, 1,1,2,2-	1	5.0E-02	L	5.0E-02	ND	NA	NA
Toluene	1	8.0E-02	K	8.0E-02	5.0E+00	1.4E+00	NA
Xylenes	1	2.0E-01	RB/OW, Su	2.0E-01	1.0E-01	2.9E-02	CNS
General Chemistry							
Nitrate-Nitrite	NA	1.0E-01	E	1.0E-01	NA	NA	NA

Table 4-1

Summary of Toxicity Assessment [a]
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

mg/kg-day - Milligrams per kilogram per day.
mg/m^3 - Milligrams per cubic meter.
GAF - Gastrointestinal absorption factor.
NA - Not available or not applicable.
ND - No data.
NC - Noncancer value is regarded as protective of cancer effects in the Integrated Risk Information System (IRIS) evaluation (EPA, 2010).

[a] See Appendix C which provides references for these values.

Target Organs: BC - blood cells; S - skin; GI - gastrointestinal; CNS - central nervous system; L - liver; F - fetus; NE - nasal epithelium; NS - nervous system; IS - immune system; Sp - spleen; RB/OW - reduced body/organ weight; SU - reduced survival; RT - respiratory tract; E - erythrocyte.

Table 5-1

Summary of Risk for All Receptors
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

	Groundskeeper [a]		Construction Worker		Indoor Worker		Resident			Hunter		Hunter's Child	
	Total ILCR	Total HI	Total ILCR	Total HI	Total ILCR	Total HI	Total ILCR	Total Adult - HI	Total Child - HI	Total ILCR	Total HI	Total ILCR	Total HI
All Pathways Assuming Bedrock Groundwater Use													
Exposure Media													
Surface Soil	1.74E-06	0.07	NE	NE	5.08E-07	0.029	NE	NE	NE	1.17E-07	0.004	2.02E-11	0.000006
Total Soil	2.50E-06	0.08	1.28E-07	0.20	NE	NE	8.12E-06	0.09	0.8	NE	NE	NE	NE
Groundwater	7.64E-04	6.0	NE	NE	7.64E-04	6.0	4.22E-03	32	73.5	NE	NE	NE	NE
Sediment	NE	NE	NA	0.002	NE	NE	NA	0.00009	0.0009	NE	NE	NE	NE
Surface Water	NE	NE	NA	NA	NE	NE	NA	NA	NA	NE	NE	NE	NE
Total ILCR or HI	**8.E-04**	**6**	**1.E-07**	**0.2**	**8.E-04**	**6**	**4.E-03**	**32**	**74**	**1.E-07**	**0.004**	**2.E-11**	**0.000006**
All Pathways Assuming Overburden Groundwater Use													
Exposure Media													
Surface Soil	1.74E-06	0.07	NE	NE	5.08E-07	0.029	NE	NE	NE	1.17E-07	0.004	2.02E-11	0.000006
Total Soil	2.50E-06	0.08	1.28E-07	0.2	NE	NE	8.12E-06	0.09	0.8	NE	NE	NE	NE
Groundwater	4.17E-05	0.37	NE	NE	4.17E-05	0.4	1.81E-04	1.0	2.4	NE	NE	NE	NE
Sediment	NE	NE	NA	0.002	NE	NE	NA	0.00009	0.0009	NE	NE	NE	NE
Surface Water	NE	NE	NA	NA	NE	NE	NA	NA	NA	NE	NE	NE	NE
Total ILCR or HI	**4.E-05**	**0.4**	**1.E-07**	**0.2**	**4.E-05**	**0.4**	**2.E-04**	**1**	**3**	**1.E-07**	**0.004**	**2.E-11**	**0.000006**

HI - Hazard index.
ILCR - Incremental lifetime cancer risk.
NA - No chemicals of potential concern available for exposure evaluation.
NE - Pathway not evaluated for this receptor.

Note:
[a] Total ILCR and total HI values for the groundskeeper reflect the respective totals for the future groundskeeper assumed to use either bedrock or overburden groundwater. The total ILCR and HI values for the current groundskeeper are simply those shown for soil. The rounded current groundskeeper ILCR is 2E-6 and the rounded HI is 0.07.

Table 5-2

Summary of Risk for Receptors[a] Excluding Exposure to Groundwater[b]
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

	Future Groundskeeper		Indoor Worker		Resident		
	Total ILCR	Total HI	Total ILCR	Total HI	Total ILCR	Total Adult - HI	Total Child - HI
Exposure Media							
Surface Soil	NE	NE	5.08E-07	0.03	NE	NE	NE
Total Soil	2.50E-06	0.08	NE	NE	8.12E-06	0.09	0.8
Sediment	NE	NE	NE	NE	NA	0.00009	0.0009
Surface Water	NE	NE	NE	NE	NA	NA	NA
Total ILCR or HI	**3.E-06**	**0.08**	**5.E-07**	**0.03**	**8.E-06**	**0.09**	**0.8**

HI - Hazard index.
ILCR - Incremental lifetime cancer risk.
NA - No chemicals of potential concern available for exposure evaluation.
NE - Pathway not evaluated for this receptor.

Notes:
[a] The above receptors are those which were evaluated for groundwater exposure as shown in Table 5-1.
[b] Groundwater use is not regarded as plausible because of low yield in the overburden and bedrock units and naturally poor quality in the bedrock unit.

FIGURES

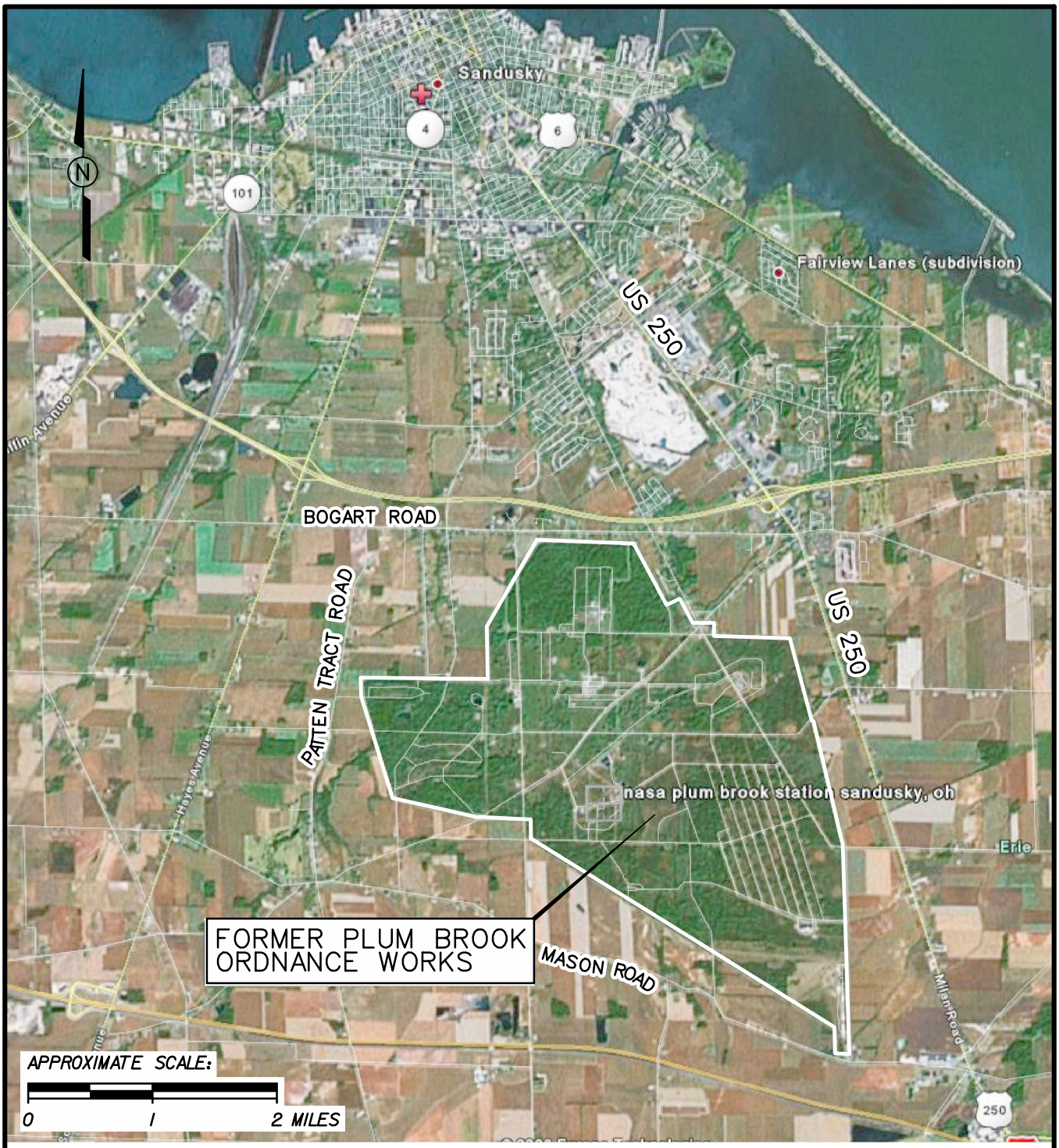

FIGURE 1-1
PBOW VICINITY MAP

WWTP1 BASELINE HUMAN HEALTH RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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wwtp1_blhhra_001.dgn cbentley 4/28/2011 2:44:21 PM PDF_with_Levels.plt SEI_TEXTSUB_ONLY.TBL

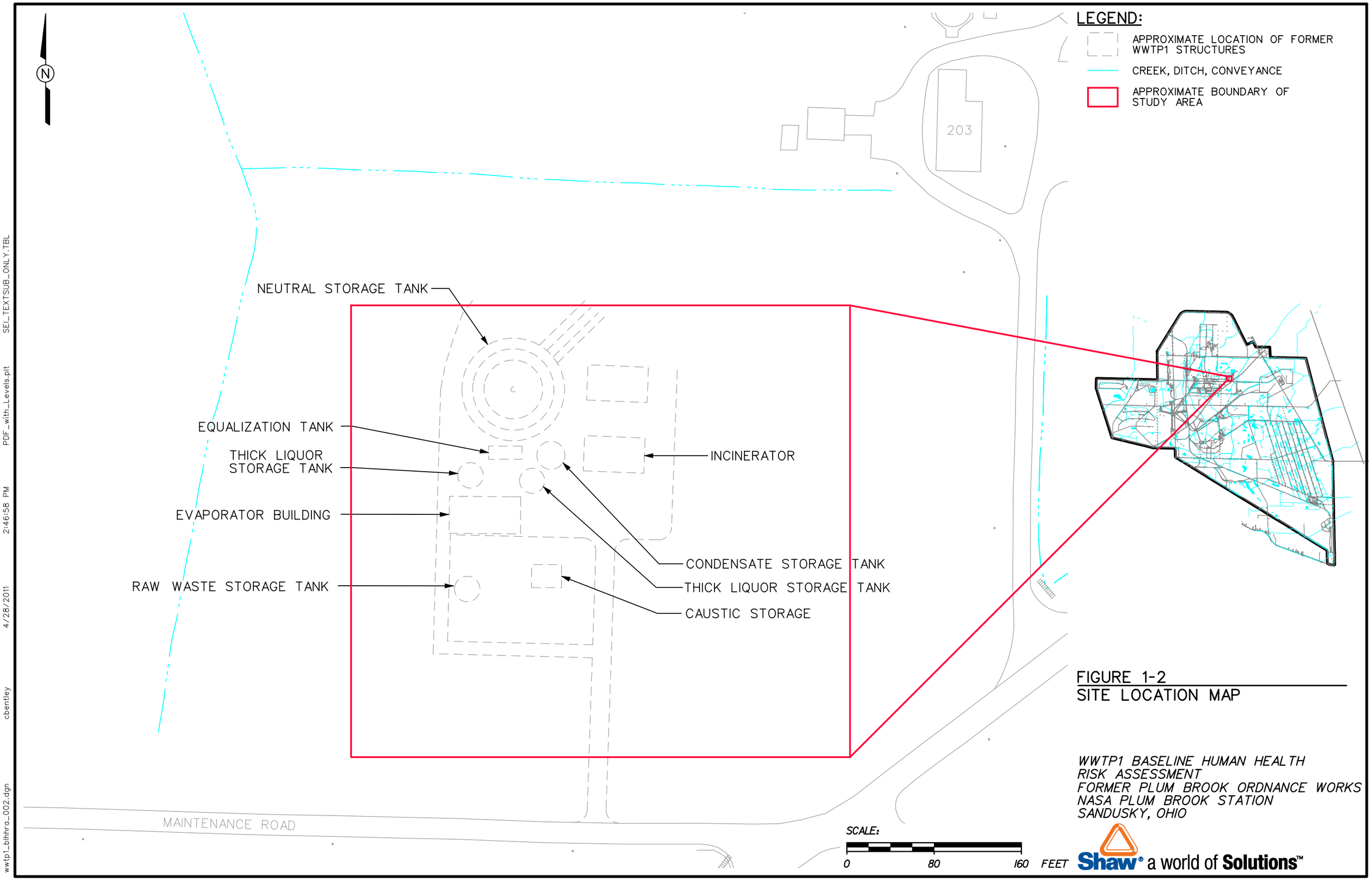
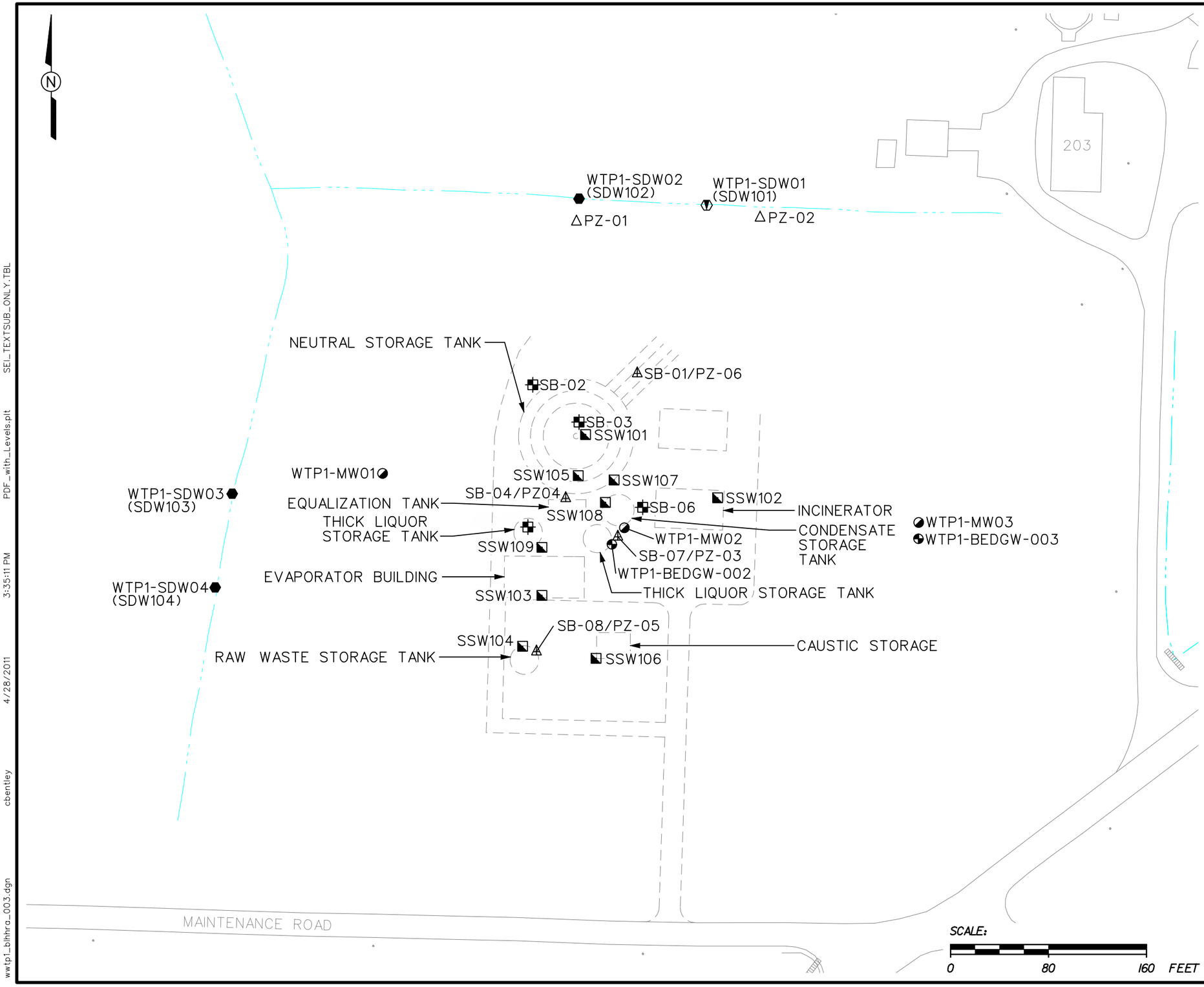


FIGURE 1-2
SITE LOCATION MAP

WWTP1 BASELINE HUMAN HEALTH RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

wwtp1_blhhra_002.dgn cbentley 4/28/2011 2:46:58 PM PDF_with_Levels.plt SEL_TEXTSUB_ONLY.TBL



LEGEND:

- 1999 SURFACE SOIL SAMPLE (USACE, 2000)
- SEDIMENT SAMPLE
- SURFACE WATER/SEDIMENT SAMPLE
- SOIL BORING
- SOIL BORING/PIEZOMETER
- PIEZOMETER
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- APPROXIMATE LOCATION OF FORMER WWTP1 STRUCTURES
- CREEK, DITCH, CONVEYANCE

NOTES:

1. SAMPLES WERE COLLECTED IN 2009 AS PART OF THE REMEDIAL INVESTIGATION OR WERE COLLECTED PREVIOUSLY IN 1999 (U.S. ARMY CORPS OF ENGINEERS, 2000, FINAL REPORT, LIMITED SITE INVESTIGATION FOR THE FORMER PLUM BROOK ORDNANCE WORKS WASTE WATER TREATMENT PLANTS 1 AND 3, JULY).
2. SEDIMENT SAMPLES WERE COLLECTED FROM EACH LOCATION IN 1999 AND IN 2009. 1999 SAMPLE IDENTIFICATION IS SHOWN IN PARENTHESES.
3. SURFACE WATER WAS COLLECTED APPROXIMATELY 15 FEET EAST OF WTP1-SDW01, BECAUSE THIS IS THE ONLY LOCATION IN THE DITCHES WHERE WATER WAS PRESENT.

FIGURE 2-1
SITE MAP WITH SAMPLE LOCATIONS

WWTP1 BASELINE HUMAN HEALTH RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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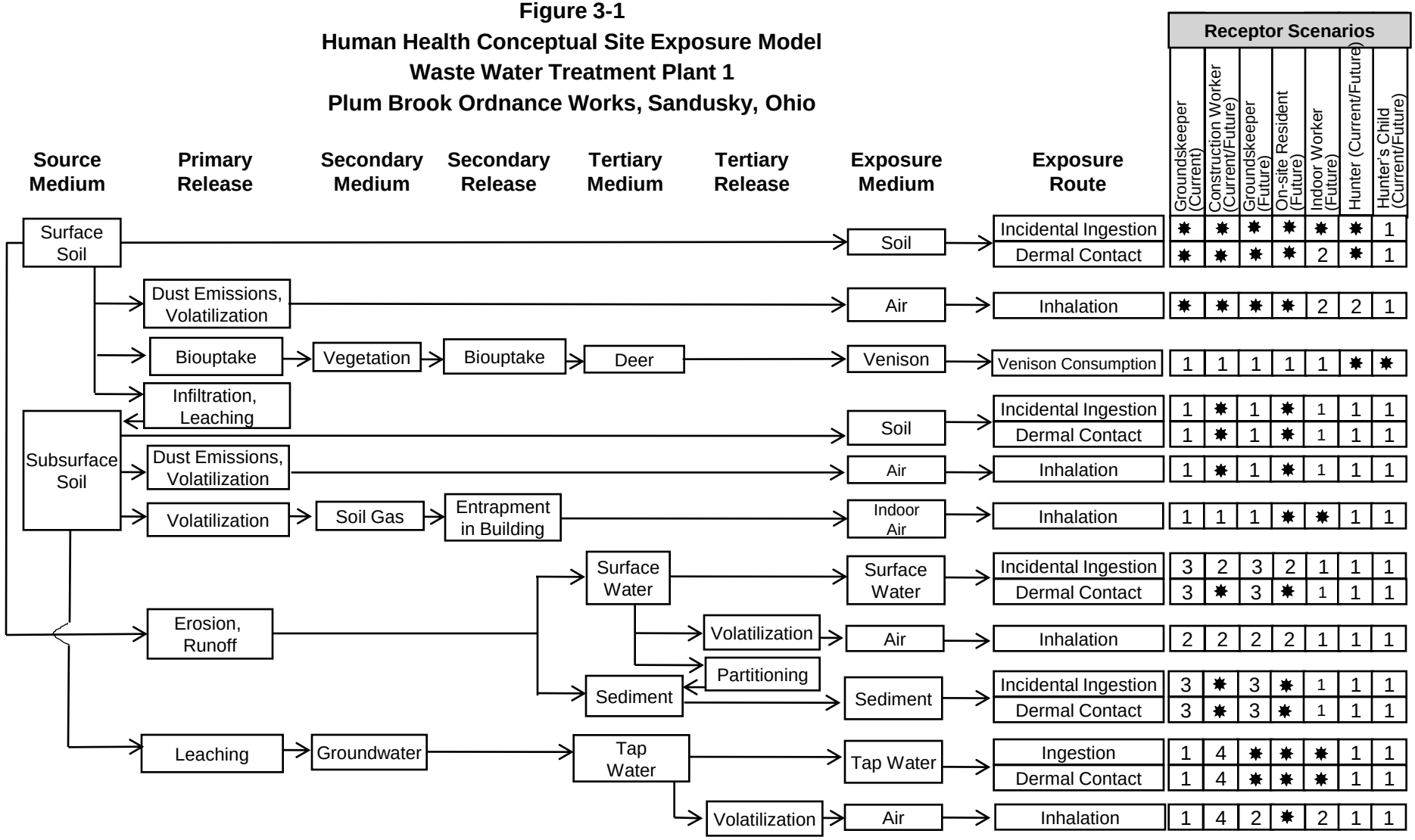
wwtp1_blhhra_003.dgn cbentley 4/28/2011 3:35:11 PM PDF_with_Levels.plt SEL_TEXTSUB_ONLY.TBL

Figure 3-1
Human Health Conceptual Site Exposure Model
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio



Exposure Route	Groundskeeper (Current)	Construction Worker (Current/Future)	Groundskeeper (Future)	On-site Resident (Future)	Indoor Worker (Future)	Hunter (Current/Future)	Hunter's Child (Current/Future)
Incidental Ingestion (Surface Soil → Soil)	✸	✸	✸	✸	✸	✸	1
Dermal Contact (Surface Soil → Soil)	✸	✸	✸	✸	2	✸	1
Inhalation (Dust Emissions, Volatilization → Air)	✸	✸	✸	✸	2	2	1
Venison Consumption (Biouptake → Vegetation → Biouptake → Deer → Venison)	1	1	1	1	1	✸	✸
Incidental Ingestion (Infiltration, Leaching → Subsurface Soil → Soil)	1	✸	1	✸	1	1	1
Dermal Contact (Infiltration, Leaching → Subsurface Soil → Soil)	1	✸	1	✸	1	1	1
Inhalation (Subsurface Soil → Dust Emissions, Volatilization → Air)	1	✸	1	✸	1	1	1
Inhalation (Subsurface Soil → Volatilization → Soil Gas → Entrapment in Building → Indoor Air)	1	1	1	✸	✸	1	1
Incidental Ingestion (Erosion, Runoff → Surface Water → Surface Water)	3	2	3	2	1	1	1
Dermal Contact (Erosion, Runoff → Surface Water → Surface Water)	3	✸	3	✸	1	1	1
Inhalation (Erosion, Runoff → Surface Water → Volatilization → Air)	2	2	2	2	1	1	1
Incidental Ingestion (Erosion, Runoff → Surface Water → Partitioning → Sediment → Sediment)	3	✸	3	✸	1	1	1
Dermal Contact (Erosion, Runoff → Surface Water → Partitioning → Sediment → Sediment)	3	✸	3	✸	1	1	1
Ingestion (Leaching → Groundwater → Tap Water → Tap Water)	1	4	✸	✸	✸	1	1
Dermal Contact (Leaching → Groundwater → Tap Water → Tap Water)	1	4	✸	✸	✸	1	1
Inhalation (Leaching → Groundwater → Tap Water → Volatilization → Air)	1	4	2	✸	2	1	1

✸ = Complete exposure route quantified in the risk assessment.
1 = There is no plausible pathway for exposure to this medium.
2 = Although theoretically complete, this pathway is not quantified as explained in text.
3 = Contact with this medium, although plausible, is not part of this receptor's normal or expected activities; therefore contact would be sporadic and is not quantified.
4 = For current use there is no plausible exposure pathway. For future use, the pathway is potentially complete, but is not quantified as explained in the text.

APPENDIX A

DATA SUMMARY OF CHEMICALS DETECTED IN OVERBURDEN GROUNDWATER PIEZOMETERS

Table A-1

Sample Summary of Overburden Piezometer Groundwater
Waste Water Treatment Plant 1
Plum Brook Ordnance Works
Sandusky, Ohio

Location	Sample Number	Sample Purpose	Sample Date	Depth (ft)	Analyses
WWTP1-PZ01	WW3000	REG	10-Dec-08	0 - 0	Cyanide, Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC
WWTP1-PZ02	WW3001	REG	10-Dec-08	13 - 13	Cyanide, Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC
WWTP1-PZ03	WW3002	REG	9-Dec-08	15 - 15	Cyanide, Explosives, Field Tests, Gen Chem, Metals (f & uf), SVOC

f & uf - Filtered and unfiltered.
Gen Chem - General Chemistry.
REG - Regular sample.
SVOC - Semivolatile organic compounds.

Table A-2

Summary of Chemicals Detected in Overburden Groundwater Piezometers
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Arithmetic Mean µg/L	RBSC [a] µg/L		Exceeds RBSCs? [b,c]
Inorganics - Unfiltered												
Aluminum	3 / 3	100	3010		17100		88.9	88.9	7.80E+03	3.70E+03		Y
Arsenic	1 / 3	33	12.7		12.7		5.56	11.1	7.01E+00	4.50E-02		Y
Barium	3 / 3	100	60.6		202		4.44	4.44	1.20E+02	7.30E+02		N
Beryllium	1 / 3	33	2.96	J	2.96	J	4.44	4.44	2.47E+00	7.30E+00		N
Calcium	3 / 3	100	53500		545000		111	111	2.34E+05	Nutrient		N
Chromium	1 / 3	33	18		18		11.1	11.1	9.70E+00	4.30E-02		Y
Cobalt	1 / 3	33	18.5		18.5		4.44	4.44	7.65E+00	1.10E+00		Y
Copper	3 / 3	100	5.6	J	31.9		11.1	11.1	1.46E+01	1.50E+02		N
Iron	3 / 3	100	3640		21500		88.9	88.9	9.62E+03	2.60E+03		Y
Lead	1 / 3	33	12.4		12.4		2.78	5.56	5.52E+00	1.50E+01	d	N
Magnesium	3 / 3	100	16900		144000		44.4	44.4	6.16E+04	Nutrient		N
Manganese	3 / 3	100	85.3		2620		4.44	4.44	9.82E+02	8.80E+01		Y
Nickel	1 / 3	33	18.9		18.9		6.67	6.67	8.52E+00	7.30E+01		N
Potassium	3 / 3	100	2460		9300		556	556	5.28E+03	Nutrient		N
Sodium	3 / 3	100	26300		185000		444	444	1.05E+05	Nutrient		N
Vanadium	3 / 3	100	7.88		44.1		4.44	4.44	2.04E+01	1.80E+01		Y
Inorganics - Filtered												
Arsenic	1 / 3	33	6.22	J	6.22	J	5.56	11.1	4.85E+00	4.50E-02		Y
Barium	2 / 2	100	44.4		80.6		4.44	4.44	6.25E+01	7.30E+02		N
Calcium	2 / 2	100	99000		126000		111	111	1.13E+05	Nutrient		N
Cobalt	1 / 2	50	5.68		5.68		4.44	4.44	3.95E+00	1.10E+00		Y
Iron	1 / 2	50	92.1		92.1		88.9	88.9	6.83E+01	2.60E+03		N
Lead	1 / 3	33	9.17		9.17		2.78	5.56	4.91E+00	1.50E+01	d	N
Magnesium	2 / 2	100	22000		40600		44.4	44.4	3.13E+04	Nutrient		N
Manganese	2 / 2	100	21.2		1120		4.44	4.44	5.71E+02	8.80E+01		Y
Nickel	1 / 2	50	8.83		8.83		6.67	6.67	6.08E+00	7.30E+01		N
Potassium	2 / 2	100	876		3340		556	556	2.11E+03	Nutrient		N
Sodium	2 / 2	100	24700		175000		222	222	9.99E+04	Nutrient		N
Thallium	1 / 3	33	4.19	J	4.19	J	2.78	5.56	3.25E+00	2.40E-01	e	Y
Semivolatile Organic Compounds												
Dinitrotoluene, 2,4-	1 / 3	33	9.92	J	9.92	J	10.2	10.6	6.77E+00	9.90E-02		Y
Dinitrotoluene, 2,6-	1 / 3	33	3.99	J	3.99	J	10.2	10.6	4.80E+00	9.90E-02		Y
Explosives												
Amino-2,6-dinitrotoluene, 4-	1 / 3	33	1.66		1.66		0.395	0.612	7.21E-01	7.30E+00		N
Dinitrotoluene, 2,4-	1 / 3	33	8.09		8.09		0.395	0.912	2.86E+00	9.90E-02		Y
Dinitrotoluene, 2,6-	1 / 3	33	4.14		4.14		0.395	0.612	1.55E+00	9.90E-02		Y

Table A-2

Summary of Chemicals Detected in Overburden Groundwater Piezometers
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Arithmetic Mean µg/L	RBSC [a] µg/L	Exceeds RBSCs? [b,c]
Trinitrotoluene, 2,4,6-	1 / 3	33	0.504	J	0.504	J	0.395	0.612	3.10E-01	1.80E+00	N
General Chemistry											
Chloride	3 / 3	100	1090		9760		250	500	5.25E+03	Nutrient	N
Nitrate-Nitrite	3 / 3	100	21	J	292		40	40	1.15E+02	1.00E+03 [f]	N
Sulfate	3 / 3	100	76700		279000		500	5000	1.54E+05	2.50E+05 [g]	Y

RBSC - Risk based screening concentration.
µg/L - micrograms per liter.
VQ - Validation qualifier.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.

[a] Risk-Based Screening Concentrations based on USEPA Regional Screening Level Table (November 2010) tap water values and are based on a risk level of 1.0E-06 and a hazard index of 0.1.
[b] N = Chemical concentration does not exceed the RBSC or is an essential nutrient.
[c] Y = Chemical concentration exceeds the RBSC, or no RBSC is available.
[d] Screening criteria for lead based on the action level of 15 µg/L (U.S. Environmental Protection Agency (EPA), 2011, *2011 Edition of the Drinking Water Standards and Health Advisories* , January, EPA 822-R-06-013).
[e] RBSC based on reference dose (RfD) thallium from IRIS, 2009. There is currently no RfD for thallium on IRIS, nor is there a Regional Screening Level listed.
[f] Because no Regional Screening Level exists for nitrate-nitrite, 0.1 X the nitrate-nitrite MCL (10 mg/L) is used for screening.
[g] Value based on Secondary Drinking Water Regulation (EPA, 2011).

APPENDIX B

ProUCL OUTPUT FOR UPPER CONFIDENCE LIMITS ON THE MEAN

Data Input for ProUCL
Surface Soil, WWTP 1
PBOW

Sample location	Sample number	Units	Vanadium	D_Vanadium	Aroclor 1254	D_Aroclor 1254	Trinitrotoluene, 2,4,6-	D_Trinitrotoluene, 2,4,6-
PBOW99-SSW101	PBOW99SSW101	mg/kg					0.25	0
PBOW99-SSW102	PBOW99SSW102	mg/kg	14.6	1	0.18	1	0.25	0
PBOW99-SSW103	PBOW99SSW103	mg/kg	12.6	1	0.085	1	0.25	0
PBOW99-SSW104	PBOW99SSW104	mg/kg					0.66	1
PBOW99-SSW104	PBOW99SSW105	mg/kg					130	1
PBOW99-SSW106	PBOW99SSW106	mg/kg	13.8	1	0.074	1	0.25	0
PBOW99-SSW107	PBOW99SSW107	mg/kg					0.25	0
PBOW99-SSW108	PBOW99SSW110	mg/kg	26.5	1				
PBOW99-SSW108	SSW-108-NE	mg/kg					2.74	1
PBOW99-SSW108	SSW-108-NW	mg/kg					49.9	1
PBOW99-SSW108	SSW-108-R	mg/kg					0.352	1
PBOW99-SSW108	SSW-108-S	mg/kg					6.24	1
PBOW99-SSW109	PBOW99SSW109	mg/kg					1.4	1
WWTP1-SB01	WW0001	mg/kg	24.5	1	0.0402	0	0.311	0
WWTP1-SB02	WW0004	mg/kg	40.5	1	0.0396	0	0.276	0
WWTP1-SB03	WW0008	mg/kg	22	1	0.0388	0	0.288	0
WWTP1-SB04	WW0011	mg/kg	31.5	1	0.04	0	26.9	1
WWTP1-SB05	WW0014	mg/kg	56.7	1	0.0378	0	0.314	0
WWTP1-SB06	WW0018WW0017	mg/kg	26.5	1	0.0404	0	0.1525	1
WWTP1-SB07	WW0021	mg/kg	36.4	1	0.0375	0	0.284	0
WWTP1-SB08	WW0024	mg/kg	26.7	1	0.0376	0	0.294	0

Data Input for ProUCL
Surface Soil, WWTP 1
PBOW

Sample location	Sample number	Units	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
PBOW99-SSW101	PBOW99SSW101	mg/kg	0.37	0	0.37	0
PBOW99-SSW102	PBOW99SSW102	mg/kg	0.51	1	0.42	1
PBOW99-SSW103	PBOW99SSW103	mg/kg	0.44	0	0.44	0
PBOW99-SSW104	PBOW99SSW104	mg/kg				
PBOW99-SSW104	PBOW99SSW105	mg/kg				
PBOW99-SSW106	PBOW99SSW106	mg/kg	0.37	0	0.37	0
PBOW99-SSW107	PBOW99SSW107	mg/kg				
PBOW99-SSW108	PBOW99SSW110	mg/kg				
PBOW99-SSW108	SSW-108-NE	mg/kg				
PBOW99-SSW108	SSW-108-NW	mg/kg				
PBOW99-SSW108	SSW-108-R	mg/kg				
PBOW99-SSW108	SSW-108-S	mg/kg				
PBOW99-SSW109	PBOW99SSW109	mg/kg				
WWTP1-SB01	WW0001	mg/kg	0.401	0	0.401	0
WWTP1-SB02	WW0004	mg/kg	0.4	0	0.4	0
WWTP1-SB03	WW0008	mg/kg	0.122	1	0.115	1
WWTP1-SB04	WW0011	mg/kg	0.4	0	0.4	0
WWTP1-SB05	WW0014	mg/kg	0.374	0	0.374	0
WWTP1-SB06	WW0018WW0017	mg/kg	0.04435	1	0.1209	1
WWTP1-SB07	WW0021	mg/kg	0.374	0	0.374	0
WWTP1-SB08	WW0024	mg/kg	0.381	0	0.381	0

Data Input for ProUCL
Surface Soil, WWTP 1
PBOW

Sample location	Sample number	Units	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Indeno(1,2,3-cd)pyrene
PBOW99-SSW101	PBOW99SSW101	mg/kg	0.37	0	0.185
PBOW99-SSW102	PBOW99SSW102	mg/kg	0.55	1	0.18
PBOW99-SSW103	PBOW99SSW103	mg/kg	0.44	0	0.22
PBOW99-SSW104	PBOW99SSW104	mg/kg			
PBOW99-SSW104	PBOW99SSW105	mg/kg			
PBOW99-SSW106	PBOW99SSW106	mg/kg	0.37	0	0.185
PBOW99-SSW107	PBOW99SSW107	mg/kg			
PBOW99-SSW108	PBOW99SSW110	mg/kg			
PBOW99-SSW108	SSW-108-NE	mg/kg			
PBOW99-SSW108	SSW-108-NW	mg/kg			
PBOW99-SSW108	SSW-108-R	mg/kg			
PBOW99-SSW108	SSW-108-S	mg/kg			
PBOW99-SSW109	PBOW99SSW109	mg/kg			
WWTP1-SB01	WW0001	mg/kg	0.401	0	0.2005
WWTP1-SB02	WW0004	mg/kg	0.4	0	0.2
WWTP1-SB03	WW0008	mg/kg	0.182	1	0.295
WWTP1-SB04	WW0011	mg/kg	0.4	0	0.2
WWTP1-SB05	WW0014	mg/kg	0.374	0	0.187
WWTP1-SB06	WW0018WW0017	mg/kg	0.13715	1	0.271
WWTP1-SB07	WW0021	mg/kg	0.374	0	0.187
WWTP1-SB08	WW0024	mg/kg	0.381	0	0.1905

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	ucl data input for ss.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Vanadium (surface soil)

General Statistics

Number of Valid Data	12	Number of Detected Data	12
Number of Distinct Detected Data	11	Number of Non-Detect Data	0
Number of Missing Values	9	Percent Non-Detects	0.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	12.6	Minimum Detected	2.534
Maximum Detected	56.7	Maximum Detected	4.038
Mean of Detected	27.69	Mean of Detected	3.229
SD of Detected	12.56	SD of Detected	0.451
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Test Statistic	0.954
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	27.69	Mean	3.229
SD	12.56	SD	0.451
95% DL/2 (t) UCL	34.2	95% H-Stat (DL/2) UCL	37.12
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	4.26	Data appear Normal at 5% Significance Level
Theta Star	6.5	
nu star	102.3	
A-D Test Statistic	0.289	**Nonparametric Statistics**
5% A-D Critical Value	0.732	Kaplan-Meier (KM) Method
K-S Test Statistic	0.732	Mean 27.69
5% K-S Critical Value	0.246	SD 12.02
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 3.625

95% KM (t) UCL	34.2
95% KM (z) UCL	33.65
95% KM (jackknife) UCL	34.2
95% KM (bootstrap t) UCL	36.39
95% KM (BCA) UCL	33.58
95% KM (Percentile Bootstrap) UCL	33.59
95% KM (Chebyshev) UCL	43.49
97.5% KM (Chebyshev) UCL	50.33
99% KM (Chebyshev) UCL	63.76

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	12.6
Maximum	56.7
Mean	27.69
Median	26.5
SD	12.56
k star	4.26
Theta star	6.5
Nu star	102.3
AppChi2	79.92
95% Gamma Approximate UCL	35.43
95% Adjusted Gamma UCL	36.82

Potential UCLs to Use

95% KM (t) UCL	34.2
95% KM (Percentile Bootstrap) UCL	33.59

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Aroclor 1254 (surface soil)

General Statistics

Number of Valid Data	11	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	8
Number of Missing Values	10	Percent Non-Detects	72.73%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.074	Minimum Detected	-2.604
Maximum Detected	0.18	Maximum Detected	-1.715
Mean of Detected	0.113	Mean of Detected	-2.261
SD of Detected	0.0583	SD of Detected	0.478
Minimum Non-Detect	0.0375	Minimum Non-Detect	-3.283
Maximum Non-Detect	0.0404	Maximum Non-Detect	-3.209

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	72.73%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.827	Shapiro Wilk Test Statistic	0.864
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution | **Assuming Lognormal Distribution**

DL/2 Substitution Method	
Mean	0.045
SD	0.0509
95% DL/2 (t) UCL	0.0728
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

DL/2 Substitution Method	
Mean	-3.481
SD	0.812
95% H-Stat (DL/2) UCL	0.0847
Log ROS Method	
Mean in Log Scale	-3.752
SD in Log Scale	0.981
Mean in Original Scale	0.0406
SD in Original Scale	0.0533
95% t UCL	0.0697
95% Percentile Bootstrap UCL	0.0697
95% BCA Bootstrap UCL	0.0795

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0846
SD	0.0303
SE of Mean	0.0112
95% KM (t) UCL	0.105
95% KM (z) UCL	0.103
95% KM (jackknife) UCL	0.1
95% KM (bootstrap t) UCL	0.152
95% KM (BCA) UCL	0.18
95% KM (Percentile Bootstrap) UCL	0.18
95% KM (Chebyshev) UCL	0.133
97.5% KM (Chebyshev) UCL	0.155
99% KM (Chebyshev) UCL	0.196

Potential UCLs to Use

95% KM (t) UCL	0.105
95% KM (Percentile Bootstrap) UCL	0.18

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Trinitrotoluene, 2,4,6- (surface soil)

General Statistics

Number of Valid Data	20	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	11
Number of Missing Values	1	Percent Non-Detects	55.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.153	Minimum Detected	-1.881

Maximum Detected	130	Maximum Detected	4.868
Mean of Detected	24.26	Mean of Detected	1.323
SD of Detected	43.11	SD of Detected	2.328
Minimum Non-Detect	0.25	Minimum Non-Detect	-1.386
Maximum Non-Detect	0.314	Maximum Non-Detect	-1.158

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	12
Number treated as Detected	8
Single DL Non-Detect Percentage	60.00%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.648
5% Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	10.99
SD	30.56
95% DL/2 (t) UCL	22.81
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.961
5% Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-0.5
SD	2.269
95% H-Stat (DL/2) UCL	96.46
Log ROS Method	
Mean in Log Scale	-1.151
SD in Log Scale	2.861
Mean in Original Scale	10.95
SD in Original Scale	30.58
95% t UCL	22.78
95% Percentile Bootstrap UCL	23.44
95% BCA Bootstrap UCL	31.21

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.313
Theta Star	77.43
nu star	5.64
A-D Test Statistic	0.414
5% A-D Critical Value	0.797
K-S Test Statistic	0.797
5% K-S Critical Value	0.299

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.153
Maximum	130
Mean	24.41
Median	25.78

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	11
SD	29.78
SE of Mean	7.064
95% KM (t) UCL	23.22
95% KM (z) UCL	22.62
95% KM (jackknife) UCL	22.72
95% KM (bootstrap t) UCL	56.96
95% KM (BCA) UCL	22.86
95% KM (Percentile Bootstrap) UCL	22.77
95% KM (Chebyshev) UCL	41.79

SD	28.19	97.5% KM (Chebyshev) UCL	55.12
k star	0.634	99% KM (Chebyshev) UCL	81.29
Theta star	38.49		
Nu star	25.37	**Potential UCLs to Use**	
AppChi2	14.89	95% KM (t) UCL	23.22
95% Gamma Approximate UCL	41.58		
95% Adjusted Gamma UCL	43.43		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)anthracene (surface soil)

General Statistics

Number of Valid Data	12	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	9
Number of Missing Values	9	Percent Non-Detects	75.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0444	Minimum Detected	-3.116
Maximum Detected	0.51	Maximum Detected	-0.673
Mean of Detected	0.225	Mean of Detected	-1.964
SD of Detected	0.249	SD of Detected	1.227
Minimum Non-Detect	0.37	Minimum Non-Detect	-0.994
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	91.67%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.871	Shapiro Wilk Test Statistic	0.99
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.203	Mean	-1.718
SD	0.108	SD	0.546
95% DL/2 (t) UCL	0.258	95% H-Stat (DL/2) UCL	0.299
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.459

SD in Log Scale	0.68
Mean in Original Scale	0.114
SD in Original Scale	0.128
95% t UCL	0.18
95% Percentile Bootstrap UCL	0.184
95% BCA Bootstrap UCL	0.214

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.119
SD	0.124
SE of Mean	0.0519
95% KM (t) UCL	0.212
95% KM (z) UCL	0.204
95% KM (jackknife) UCL	0.226
95% KM (bootstrap t) UCL	0.237
95% KM (BCA) UCL	0.51
95% KM (Percentile Bootstrap) UCL	0.51
95% KM (Chebyshev) UCL	0.345
97.5% KM (Chebyshev) UCL	0.443
99% KM (Chebyshev) UCL	0.635

Potential UCLs to Use

95% KM (t) UCL	0.212
95% KM (Percentile Bootstrap) UCL	0.51

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)pyrene (surface soil)

General Statistics

Number of Valid Data	12	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	9
Number of Missing Values	9	Percent Non-Detects	75.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.115	Minimum Detected	-2.163
Maximum Detected	0.42	Maximum Detected	-0.868
Mean of Detected	0.219	Mean of Detected	-1.714
SD of Detected	0.174	SD of Detected	0.734
Minimum Non-Detect	0.37	Minimum Non-Detect	-0.994
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended

Number treated as Non-Detect 12

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.764
5% Shapiro Wilk Critical Value	0.767

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.201
SD	0.0758
95% DL/2 (t) UCL	0.24
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.779
5% Shapiro Wilk Critical Value	0.767

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.656
SD	0.319
95% H-Stat (DL/2) UCL	0.242
Log ROS Method	
Mean in Log Scale	-1.989
SD in Log Scale	0.398
Mean in Original Scale	0.15
SD in Original Scale	0.088
95% t UCL	0.196
95% Percentile Bootstrap UCL	0.198
95% BCA Bootstrap UCL	0.224

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.145
SD	0.0869
SE of Mean	0.0321
95% KM (t) UCL	0.203
95% KM (z) UCL	0.198
95% KM (jackknife) UCL	0.195
95% KM (bootstrap t) UCL	0.776
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.286
97.5% KM (Chebyshev) UCL	0.346
99% KM (Chebyshev) UCL	0.465

Potential UCLs to Use

95% KM (t) UCL	0.203

95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(b)fluoranthene (surface soil)

General Statistics

Number of Valid Data	12	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	9
Number of Missing Values	9	Percent Non-Detects	75.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.137	Minimum Detected	-1.987
Maximum Detected	0.55	Maximum Detected	-0.598
Mean of Detected	0.29	Mean of Detected	-1.429
SD of Detected	0.227	SD of Detected	0.734
Minimum Non-Detect	0.37	Minimum Non-Detect	-0.994
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	91.67%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.83	Shapiro Wilk Test Statistic	0.895
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.219	Mean	-1.585
SD	0.106	SD	0.33
95% DL/2 (t) UCL	0.274	95% H-Stat (DL/2) UCL	0.263
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.722
		SD in Log Scale	0.405
		Mean in Original Scale	0.197
		SD in Original Scale	0.116
		95% t UCL	0.257
		95% Percentile Bootstrap UCL	0.257

95% BCA Bootstrap UCL	0.289

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.192
SD	0.11
SE of Mean	0.0421
95% KM (t) UCL	0.268
95% KM (z) UCL	0.261
95% KM (jackknife) UCL	0.269
95% KM (bootstrap t) UCL	0.356
95% KM (BCA) UCL	0.55
95% KM (Percentile Bootstrap) UCL	0.55
95% KM (Chebyshev) UCL	0.376
97.5% KM (Chebyshev) UCL	0.455
99% KM (Chebyshev) UCL	0.611

Potential UCLs to Use

95% KM (t) UCL	0.268
95% KM (Percentile Bootstrap) UCL	0.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	ucl data input for ss.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Indeno(1,2,3-cd)pyrene (surface soil)

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
Number of Missing Values	9		

Raw Statistics

Minimum	0.18
Maximum	0.295
Mean	0.208
Median	0.195
SD	0.0368
Coefficient of Variation	0.177
Skewness	1.795

Log-transformed Statistics

Minimum of Log Data	-1.715
Maximum of Log Data	-1.221
Mean of log Data	-1.581
SD of log Data	0.159

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.718
Shapiro Wilk Critical Value	0.859

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.227

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.232
95% Modified-t UCL (Johnson-1978)	0.228

Gamma Distribution Test

k star (bias corrected)	30.43
Theta Star	0.00685
MLE of Mean	0.208
MLE of Standard Deviation	0.0378
nu star	730.3
Approximate Chi Square Value (.05)	668.6
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	659.6
Anderson-Darling Test Statistic	1.401
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.326
Kolmogorov-Smirnov 5% Critical Value	0.245

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.228
95% Adjusted Gamma UCL	0.231

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.753
Shapiro Wilk Critical Value	0.859

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	0.227
95% Chebyshev (MVUE) UCL	0.25
97.5% Chebyshev (MVUE) UCL	0.268
99% Chebyshev (MVUE) UCL	0.303

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.226
95% Jackknife UCL	0.227
95% Standard Bootstrap UCL	0.225
95% Bootstrap-t UCL	0.262
95% Hall's Bootstrap UCL	0.313
95% Percentile Bootstrap UCL	0.226
95% BCA Bootstrap UCL	0.232
95% Chebyshev(Mean, Sd) UCL	0.255
97.5% Chebyshev(Mean, Sd) UCL	0.275
99% Chebyshev(Mean, Sd) UCL	0.314

Potential UCL to Use

Use 95% Student's-t UCL	0.227
or 95% Modified-t UCL	0.228

Data Input for ProUCL
Total Soil, WWTP 1
PBOW

Sample location	Sample number	Vanadium mg/kg	D_Vanadium	Aroclor 1254 mg/kg	D_Aroclor 1254	Dinitrotoluene, 2,4- mg/kg	D_Dinitrotoluene, 2,4-
PBOW99-SSW102	PBOW99SSW102	14.6	1	0.18	1	0.25	0
PBOW99-SSW103	PBOW99SSW103	12.6	1	0.085	1	0.25	0
PBOW99-SSW106	PBOW99SSW106	13.8	1	0.074	1	0.25	0
WWTP1-SB01	WW0001	24.5	1	0.0201	0	0.311	0
WWTP1-SB01	WW0002	20.2	1	0.02005	0	0.297	0
WWTP1-SB02	WW0004	40.5	1	0.0198	0	0.276	0
WWTP1-SB02	WW0005WW0006	20.7	1	0.020025	0	1.188	1
WWTP1-SB03	WW0008	22	1	0.0194	0	0.288	0
WWTP1-SB03	WW0009	17.7	1	0.02	0	2.58	1
WWTP1-SB04	WW0011	31.5	1	0.02	0	0.317	0
WWTP1-SB04	WW0012	19.7	1	0.0198	0	2.09	1
WWTP1-SB05	WW0014	56.7	1	0.0189	0	0.314	0
WWTP1-SB05	WW0015	12.4	1	0.02	0	9.47	1
WWTP1-SB06	WW0018WW0017	26.5	1	0.0202	0	0.2845	0
WWTP1-SB06	WW0019	21.1	1	0.0198	0	0.585	1
WWTP1-SB07	WW0021	36.4	1	0.01875	0	0.284	0
WWTP1-SB07	WW0022	12.3	1	0.0202	0	3.87	1
WWTP1-SB08	WW0024	26.7	1	0.0188	0	0.294	0
WWTP1-SB08	WW0025	25.6	1	0.0195	0	0.192	1
WWTP1-SB08	WW0026WW0027	16.2	1			1.15	1
PBOW99-SSW108	PBOW99SSW110	26.5	1				
WWTP1-SB01	WW0003	17.8	1			0.274	0
WWTP1-SB02	WW0007	21.2	1			0.286	0
WWTP1-SB03	WW0010	21.8	1			0.299	0
WWTP1-SB04	WW0013	22.7	1			0.303	0
WWTP1-SB05	WW0016	25.2	1			0.766	1
WWTP1-SB06	WW0020	23.8	1			0.276	0
WWTP1-SB07	WW0023	18.1	1			0.291	0
PBOW99-SSW101	PBOW99SSW101					0.25	0
PBOW99-SSW107	PBOW99SSW107					0.25	0
PBOW99-SSW109	PBOW99SSW109					0.25	0
PBOW99-SSW104	PBOW99SSW104					0.25	0
PBOW99-SSW104	PBOW99SSW105					5	0
PBOW99-SSW108	SSW-108-NE					0.15	0
PBOW99-SSW108	SSW-108-NW					0.3	0
PBOW99-SSW108	SSW-108-R					0.176	1
PBOW99-SSW108	SSW-108-S					0.19	0

Data Input for ProUCL
Total Soil, WWTP 1
PBOW

Sample location	Sample number	Dinitrotoluene, 2,6- mg/kg	D_Dinitrotoluene, 2,6-	Trinitrotoluene, 2,4,6- mg/kg	D_Trinitrotoluene, 2,4,6-
PBOW99-SSW102	PBOW99SSW102	0.25	0	0.25	0
PBOW99-SSW103	PBOW99SSW103	0.25	0	0.25	0
PBOW99-SSW106	PBOW99SSW106	0.25	0	0.25	0
WWTP1-SB01	WW0001	0.311	0	0.311	0
WWTP1-SB01	WW0002	0.297	0	0.297	0
WWTP1-SB02	WW0004	0.276	0	0.276	0
WWTP1-SB02	WW0005WW0006	0.18825	1	0.1685	1
WWTP1-SB03	WW0008	0.288	0	0.288	0
WWTP1-SB03	WW0009	0.272	1	0.296	1
WWTP1-SB04	WW0011	0.317	0	26.9	1
WWTP1-SB04	WW0012	0.326	1	181	1
WWTP1-SB05	WW0014	0.314	0	0.314	0
WWTP1-SB05	WW0015	2.03	1	3.54	1
WWTP1-SB06	WW0018WW0017	0.2845	0	0.1525	1
WWTP1-SB06	WW0019	0.275	0	0.275	0
WWTP1-SB07	WW0021	0.284	0	0.284	0
WWTP1-SB07	WW0022	1.48	1	0.317	0
WWTP1-SB08	WW0024	0.294	0	0.294	0
WWTP1-SB08	WW0025	0.311	0	0.413	1
WWTP1-SB08	WW0026WW0027	0.2885	0	0.3335	1
PBOW99-SSW108	PBOW99SSW110				
WWTP1-SB01	WW0003	0.274	0	0.274	0
WWTP1-SB02	WW0007	0.286	0	0.286	0
WWTP1-SB03	WW0010	0.299	0	0.299	0
WWTP1-SB04	WW0013	0.303	0	0.303	0
WWTP1-SB05	WW0016	0.29	0	0.29	0
WWTP1-SB06	WW0020	0.276	0	0.276	0
WWTP1-SB07	WW0023	0.291	0	0.291	0
PBOW99-SSW101	PBOW99SSW101	0.25	0	0.25	0
PBOW99-SSW107	PBOW99SSW107	0.25	0	0.25	0
PBOW99-SSW109	PBOW99SSW109	0.25	0	1.4	1
PBOW99-SSW104	PBOW99SSW104	0.25	0	0.66	1
PBOW99-SSW104	PBOW99SSW105	5	0	130	1
PBOW99-SSW108	SSW-108-NE	0.15	0	2.74	1
PBOW99-SSW108	SSW-108-NW	0.15	0	49.9	1
PBOW99-SSW108	SSW-108-R	0.19	0	0.352	1
PBOW99-SSW108	SSW-108-S	0.19	0	6.24	1

Data Input for ProUCL
Total Soil, WWTP 1
PBOW

Sample location	Sample number	Benzo(a)anthracene mg/kg	D_Benzo(a)anthracene	Benzo(a)pyrene mg/kg	D_Benzo(a)pyrene	Benzo(b)fluoranthene mg/kg
PBOW99-SSW102	PBOW99SSW102	0.51	1	0.42	1	0.55
PBOW99-SSW103	PBOW99SSW103	0.44	0	0.44	0	0.44
PBOW99-SSW106	PBOW99SSW106	0.37	0	0.37	0	0.37
WWTP1-SB01	WW0001	0.401	0	0.401	0	0.401
WWTP1-SB01	WW0002	0.401	0	0.401	0	0.401
WWTP1-SB02	WW0004	0.4	0	0.4	0	0.4
WWTP1-SB02	WW0005WW0006	0.399	0	0.399	0	0.399
WWTP1-SB03	WW0008	0.122	1	0.115	1	0.182
WWTP1-SB03	WW0009	0.396	0	0.396	0	0.396
WWTP1-SB04	WW0011	0.4	0	0.4	0	0.4
WWTP1-SB04	WW0012	0.404	0	0.404	0	0.404
WWTP1-SB05	WW0014	0.374	0	0.374	0	0.374
WWTP1-SB05	WW0015	0.4	0	0.4	0	0.4
WWTP1-SB06	WW0018WW0017	0.04435	1	0.1209	1	0.13715
WWTP1-SB06	WW0019	0.4	0	0.4	0	0.4
WWTP1-SB07	WW0021	0.374	0	0.374	0	0.374
WWTP1-SB07	WW0022	0.404	0	0.404	0	0.404
WWTP1-SB08	WW0024	0.381	0	0.381	0	0.381
WWTP1-SB08	WW0025	0.169	1	0.19	1	0.279
WWTP1-SB08	WW0026WW0027	0.3725	0	0.3725	0	0.3725
PBOW99-SSW108	PBOW99SSW110					
WWTP1-SB01	WW0003	0.373	0	0.373	0	0.373
WWTP1-SB02	WW0007	0.394	0	0.394	0	0.394
WWTP1-SB03	WW0010	0.388	0	0.388	0	0.388
WWTP1-SB04	WW0013	0.389	0	0.389	0	0.389
WWTP1-SB05	WW0016	0.397	0	0.397	0	0.397
WWTP1-SB06	WW0020	0.391	0	0.391	0	0.391
WWTP1-SB07	WW0023	0.379	0	0.379	0	0.379
PBOW99-SSW101	PBOW99SSW101	0.37	0	0.37	0	0.37
PBOW99-SSW107	PBOW99SSW107					
PBOW99-SSW109	PBOW99SSW109					
PBOW99-SSW104	PBOW99SSW104					
PBOW99-SSW104	PBOW99SSW105					
PBOW99-SSW108	SSW-108-NE					
PBOW99-SSW108	SSW-108-NW					
PBOW99-SSW108	SSW-108-R					
PBOW99-SSW108	SSW-108-S					

Data Input for ProUCL
Total Soil, WWTP 1
PBOW

Sample location	Sample number	D_Benzo(b)fluoranthene	Indeno(1,2,3-cd)pyrene mg/kg	D_Indeno(1,2,3-cd)pyrene	Dinitrobenzene, 1,3- mg/kg
PBOW99-SSW102	PBOW99SSW102	1	0.36	0	0.125
PBOW99-SSW103	PBOW99SSW103	0	0.44	0	0.125
PBOW99-SSW106	PBOW99SSW106	0	0.37	0	0.125
WWTP1-SB01	WW0001	0	0.401	0	0.1555
WWTP1-SB01	WW0002	0	0.401	0	0.1485
WWTP1-SB02	WW0004	0	0.4	0	0.138
WWTP1-SB02	WW0005WW0006	0	0.399	0	0.14025
WWTP1-SB03	WW0008	1	0.295	1	0.144
WWTP1-SB03	WW0009	0	0.396	0	0.922
WWTP1-SB04	WW0011	0	0.4	0	0.1585
WWTP1-SB04	WW0012	0	0.404	0	0.14
WWTP1-SB05	WW0014	0	0.374	0	0.157
WWTP1-SB05	WW0015	0	0.4	0	0.153
WWTP1-SB06	WW0018WW0017	1	0.271	1	0.14225
WWTP1-SB06	WW0019	0	0.4	0	0.1375
WWTP1-SB07	WW0021	0	0.374	0	0.142
WWTP1-SB07	WW0022	0	0.404	0	0.1585
WWTP1-SB08	WW0024	0	0.381	0	0.147
WWTP1-SB08	WW0025	1	0.343	1	0.1555
WWTP1-SB08	WW0026WW0027	0	0.3725	0	0.14425
PBOW99-SSW108	PBOW99SSW110				
WWTP1-SB01	WW0003	0	0.373	0	0.137
WWTP1-SB02	WW0007	0	0.394	0	0.143
WWTP1-SB03	WW0010	0	0.388	0	0.1495
WWTP1-SB04	WW0013	0	0.389	0	0.1515
WWTP1-SB05	WW0016	0	0.397	0	0.145
WWTP1-SB06	WW0020	0	0.391	0	0.138
WWTP1-SB07	WW0023	0	0.379	0	0.1455
PBOW99-SSW101	PBOW99SSW101	0	0.37	0	0.125
PBOW99-SSW107	PBOW99SSW107				0.125
PBOW99-SSW109	PBOW99SSW109				0.125
PBOW99-SSW104	PBOW99SSW104				0.125
PBOW99-SSW104	PBOW99SSW105				2.5
PBOW99-SSW108	SSW-108-NE				0.075
PBOW99-SSW108	SSW-108-NW				0.075
PBOW99-SSW108	SSW-108-R				0.095
PBOW99-SSW108	SSW-108-S				0.095

ProUCL Output - Total Soil
WWTP 1, PBOW

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	ucl data input for ts.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Vanadium (total soil)

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	27

Raw Statistics		Log-transformed Statistics	
Minimum	12.3	Minimum of Log Data	2.51
Maximum	56.7	Maximum of Log Data	4.038
Mean	23.17	Mean of log Data	3.078
Median	21.5	SD of log Data	0.356
SD	9.417		
Coefficient of Variation	0.406		
Skewness	1.904		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.838	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	26.2	95% H-UCL	26.24
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30
95% Adjusted-CLT UCL (Chen-1995)	26.78	97.5% Chebyshev (MVUE) UCL	32.99
95% Modified-t UCL (Johnson-1978)	26.31	99% Chebyshev (MVUE) UCL	38.88

Gamma Distribution Test		Data Distribution
k star (bias corrected)	7.015	Data appear Gamma Distributed at 5% Significance Level
Theta Star	3.303	
MLE of Mean	23.17	
MLE of Standard Deviation	8.749	
nu star	392.8	
Approximate Chi Square Value (.05)	347.9	**Nonparametric Statistics**
Adjusted Level of Significance	0.0404	95% CLT UCL 26.1
Adjusted Chi Square Value	345.3	95% Jackknife UCL 26.2
		95% Standard Bootstrap UCL 26.11
Anderson-Darling Test Statistic	0.511	95% Bootstrap-t UCL 27.45
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL 29.23
Kolmogorov-Smirnov Test Statistic	0.157	95% Percentile Bootstrap UCL 26.25
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL 26.94
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 30.93
		97.5% Chebyshev(Mean, Sd) UCL 34.29
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 40.88
95% Approximate Gamma UCL	26.16	
95% Adjusted Gamma UCL	26.36	

Potential UCL to Use	Use 95% Approximate Gamma UCL 26.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Aroclor 1254 (total soil)

General Statistics

Number of Valid Data	19	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	16
		Percent Non-Detects	84.21%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.074	Minimum Detected	-2.604
Maximum Detected	0.18	Maximum Detected	-1.715
Mean of Detected	0.113	Mean of Detected	-2.261
SD of Detected	0.0583	SD of Detected	0.478
Minimum Non-Detect	0.0188	Minimum Non-Detect	-3.977
Maximum Non-Detect	0.0202	Maximum Non-Detect	-3.902

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	16
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	84.21%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.827	Shapiro Wilk Test Statistic	0.864
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0261	Mean	-4.248
SD	0.0433	SD	0.898
95% DL/2 (t) UCL	0.0433	95% H-Stat (DL/2) UCL	0.0361
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-4.497
		SD in Log Scale	1.113
		Mean in Original Scale	0.0248
		SD in Original Scale	0.044
		95% t UCL	0.0423
		95% Percentile Bootstrap UCL	0.0426
		95% BCA Bootstrap UCL	0.0495

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A

Data appear Normal at 5% Significance Level

A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0802
SD	0.0237
SE of Mean	0.00665
95% KM (t) UCL	0.0917
95% KM (z) UCL	0.0911
95% KM (jackknife) UCL	0.0901
95% KM (bootstrap t) UCL	0.119
95% KM (BCA) UCL	0.18
95% KM (Percentile Bootstrap) UCL	0.18
95% KM (Chebyshev) UCL	0.109
97.5% KM (Chebyshev) UCL	0.122
99% KM (Chebyshev) UCL	0.146

Potential UCLs to Use

95% KM (t) UCL	0.0917
95% KM (Percentile Bootstrap) UCL	0.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Dinitrobenzene, 1,3- (Total Soil)

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	25

Raw Statistics

Minimum	0.075
Maximum	2.5
Mean	0.222
Median	0.142
SD	0.412
Coefficient of Variation	1.854
Skewness	5.232

Log-transformed Statistics

Minimum of Log Data	-2.59
Maximum of Log Data	0.916
Mean of log Data	-1.883
SD of log Data	0.607

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.276
Shapiro Wilk Critical Value	0.935

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.339

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.4
95% Modified-t UCL (Johnson-1978)	0.349

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.515
Shapiro Wilk Critical Value	0.935

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	0.224
95% Chebyshev (MVUE) UCL	0.267
97.5% Chebyshev (MVUE) UCL	0.304
99% Chebyshev (MVUE) UCL	0.377

Gamma Distribution Test

k star (bias corrected)	1.356
Theta Star	0.164
MLE of Mean	0.222
MLE of Standard Deviation	0.191
nu star	97.63
Approximate Chi Square Value (.05)	75.84
Adjusted Level of Significance	0.0428
Adjusted Chi Square Value	74.97
Anderson-Darling Test Statistic	8.959
Anderson-Darling 5% Critical Value	0.767
Kolmogorov-Smirnov Test Statistic	0.485
Kolmogorov-Smirnov 5% Critical Value	0.15

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.286
95% Adjusted Gamma UCL	0.29

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.336
95% Jackknife UCL	0.339
95% Standard Bootstrap UCL	0.336
95% Bootstrap-t UCL	2.008
95% Hall's Bootstrap UCL	1.611
95% Percentile Bootstrap UCL	0.351
95% BCA Bootstrap UCL	0.424
95% Chebyshev(Mean, Sd) UCL	0.522
97.5% Chebyshev(Mean, Sd) UCL	0.652
99% Chebyshev(Mean, Sd) UCL	0.906

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.522

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Dinitrotoluene, 2,4- (Total Soil)

General Statistics

Number of Valid Data	36	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	26
Number of Missing Values	1	Percent Non-Detects	72.22%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.176	Minimum Detected	-1.737
Maximum Detected	9.47	Maximum Detected	2.248
Mean of Detected	2.207	Mean of Detected	0.141
SD of Detected	2.803	SD of Detected	1.26
Minimum Non-Detect	0.15	Minimum Non-Detect	-1.897
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	1
Single DL Non-Detect Percentage	97.22%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.72	Shapiro Wilk Test Statistic	0.968
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution
DL/2 Substitution Method	DL/2 Substitution Method

Mean	0.777	Mean	-1.331
SD	1.727	SD	1.232
95% DL/2 (t) UCL	1.263	95% H-Stat (DL/2) UCL	0.982

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.791
		SD in Log Scale	1.488
		Mean in Original Scale	0.683
		SD in Original Scale	1.715
		95% t UCL	1.166
		95% Percentile Bootstrap UCL	1.201
		95% BCA Bootstrap UCL	1.5

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.696	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.172		
nu star	13.91		
A-D Test Statistic	0.256	**Nonparametric Statistics**	
5% A-D Critical Value	0.752	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.752	Mean	0.752
5% K-S Critical Value	0.275	SD	1.673
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.295
		95% KM (t) UCL	1.25
Assuming Gamma Distribution		95% KM (z) UCL	1.237
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.224
Minimum	0.176	95% KM (bootstrap t) UCL	1.891
Maximum	9.47	95% KM (BCA) UCL	1.56
Mean	2.249	95% KM (Percentile Bootstrap) UCL	1.354
Median	2.269	95% KM (Chebyshev) UCL	2.037
SD	1.58	97.5% KM (Chebyshev) UCL	2.593
k star	2.13	99% KM (Chebyshev) UCL	3.686
Theta star	1.056		
Nu star	153.4	Potential UCLs to Use	
AppChi2	125.8	95% KM (t) UCL	1.25
95% Gamma Approximate UCL	2.743		
95% Adjusted Gamma UCL	2.768		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Dinitrotoluene, 2,6- (Total Soil)

General Statistics

Number of Valid Data	36	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	31
Number of Missing Values	1	Percent Non-Detects	86.11%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.188	Minimum Detected	-1.67
Maximum Detected	2.03	Maximum Detected	0.708
Mean of Detected	0.859	Mean of Detected	-0.599

SD of Detected	0.842	SD of Detected	1.073
Minimum Non-Detect	0.15	Minimum Non-Detect	-1.897
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.81
5% Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.859
5% Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.3
SD	0.537
95% DL/2 (t) UCL	0.451
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.752
SD	0.79
95% H-Stat (DL/2) UCL	0.316
Log ROS Method	
Mean in Log Scale	-2.825
SD in Log Scale	1.13
Mean in Original Scale	0.161
SD in Original Scale	0.403
95% t UCL	0.275
95% Percentile Bootstrap UCL	0.284
95% BCA Bootstrap UCL	0.331

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.637
Theta Star	1.349
nu star	6.371
A-D Test Statistic	0.536
5% A-D Critical Value	0.689
K-S Test Statistic	0.689
5% K-S Critical Value	0.363

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.188
Maximum	2.03
Mean	0.86
Median	0.865
SD	0.289
k star	7.344

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.288
SD	0.368
SE of Mean	0.0698
95% KM (t) UCL	0.406
95% KM (z) UCL	0.402
95% KM (jackknife) UCL	0.381
95% KM (bootstrap t) UCL	0.797
95% KM (BCA) UCL	1.496
95% KM (Percentile Bootstrap) UCL	0.547
95% KM (Chebyshev) UCL	0.592
97.5% KM (Chebyshev) UCL	0.724
99% KM (Chebyshev) UCL	0.982

Theta star	0.117		
Nu star	528.8	Potential UCLs to Use	
AppChi2	476.5	95% KM (t) UCL	0.406
95% Gamma Approximate UCL	0.955	95% KM (Percentile Bootstrap) UCL	0.547
95% Adjusted Gamma UCL	0.959		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Trinitrotoluene, 2,4,6- (Total Soil)

General Statistics

Number of Valid Data	36	Number of Detected Data	15
Number of Distinct Detected Data	15	Number of Non-Detect Data	21
Number of Missing Values	1	Percent Non-Detects	58.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.153	Minimum Detected	-1.881
Maximum Detected	181	Maximum Detected	5.198
Mean of Detected	26.94	Mean of Detected	0.892
SD of Detected	54.81	SD of Detected	2.426
Minimum Non-Detect	0.25	Minimum Non-Detect	-1.386
Maximum Non-Detect	0.317	Maximum Non-Detect	-1.149

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	24
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	12
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	66.67%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.568	Shapiro Wilk Test Statistic	0.895
5% Shapiro Wilk Critical Value	0.881	5% Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	11.31	Mean	-0.772
SD	37.16	SD	2.096
95% DL/2 (t) UCL	21.77	95% H-Stat (DL/2) UCL	16.3
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.451
		SD in Log Scale	2.597
		Mean in Original Scale	11.26
		SD in Original Scale	37.18
		95% t UCL	21.73
		95% Percentile Bootstrap UCL	22.62
		95% BCA Bootstrap UCL	26.25

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.276	Data Follow Appr. Gamma Distribution at 5% Significance Level
Theta Star	97.75	

nu star	8.268
A-D Test Statistic	1.198
5% A-D Critical Value	0.84
K-S Test Statistic	0.84
5% K-S Critical Value	0.241

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.153
Maximum	181
Mean	27.32
Median	28.34
SD	35.03
k star	0.56
Theta star	48.83
Nu star	40.29
AppChi2	26.75
95% Gamma Approximate UCL	41.16
95% Adjusted Gamma UCL	41.95

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	11.32
SD	36.64
SE of Mean	6.321
95% KM (t) UCL	22
95% KM (z) UCL	21.72
95% KM (jackknife) UCL	21.78
95% KM (bootstrap t) UCL	52.9
95% KM (BCA) UCL	23.05
95% KM (Percentile Bootstrap) UCL	22.81
95% KM (Chebyshev) UCL	38.87
97.5% KM (Chebyshev) UCL	50.79
99% KM (Chebyshev) UCL	74.21

Potential UCLs to Use

95% KM (t) UCL	22

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)anthracene (Total Soil)

General Statistics

Number of Valid Data	28	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	24
Number of Missing Values	1	Percent Non-Detects	85.71%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0444	Minimum Detected	-3.116
Maximum Detected	0.51	Maximum Detected	-0.673
Mean of Detected	0.211	Mean of Detected	-1.918
SD of Detected	0.206	SD of Detected	1.006
Minimum Non-Detect	0.37	Minimum Non-Detect	-0.994
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	27
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	96.43%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only | **Lognormal Distribution Test with Detected Values Only**

Shapiro Wilk Test Statistic	0.847
5% Shapiro Wilk Critical Value	0.748

Data appear Normal at 5% Significance Level

Shapiro Wilk Test Statistic	0.989
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.198
SD	0.0692
95% DL/2 (t) UCL	0.22
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.672
SD	0.353
95% H-Stat (DL/2) UCL	0.226
Log ROS Method	
Mean in Log Scale	-2.294
SD in Log Scale	0.455
Mean in Original Scale	0.115
SD in Original Scale	0.0838
95% t UCL	0.142
95% Percentile Bootstrap UCL	0.145
95% BCA Bootstrap UCL	0.155

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.547
Theta Star	0.386
nu star	4.376
A-D Test Statistic	0.265
5% A-D Critical Value	0.662
K-S Test Statistic	0.662
5% K-S Critical Value	0.399

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0444
Maximum	0.51
Mean	0.208
Median	0.21
SD	0.0712
k star	8.101
Theta star	0.0257
Nu star	453.6
AppChi2	405.3
95% Gamma Approximate UCL	0.233
95% Adjusted Gamma UCL	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.126
SD	0.0895
SE of Mean	0.0368
95% KM (t) UCL	0.189
95% KM (z) UCL	0.186
95% KM (jackknife) UCL	0.202
95% KM (bootstrap t) UCL	0.194
95% KM (BCA) UCL	0.193
95% KM (Percentile Bootstrap) UCL	0.198
95% KM (Chebyshev) UCL	0.286
97.5% KM (Chebyshev) UCL	0.356
99% KM (Chebyshev) UCL	0.492

Potential UCLs to Use

95% KM (t) UCL	0.189
95% KM (Percentile Bootstrap) UCL	0.198

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)pyrene (Total Soil)

General Statistics

Number of Valid Data	28	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	24

Number of Missing Values	1	Percent Non-Detects	85.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.115	Minimum Detected	-2.163
Maximum Detected	0.42	Maximum Detected	-0.868
Mean of Detected	0.211	Mean of Detected	-1.701
SD of Detected	0.143	SD of Detected	0.6
Minimum Non-Detect	0.37	Minimum Non-Detect	-0.994
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	28
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.796	Shapiro Wilk Test Statistic	0.865
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.198	Mean	-1.641
SD	0.0486	SD	0.205
95% DL/2 (t) UCL	0.214	95% H-Stat (DL/2) UCL	0.212
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.925
		SD in Log Scale	0.272
		Mean in Original Scale	0.152
		SD in Original Scale	0.0582
		95% t UCL	0.171
		95% Percentile Bootstrap UCL	0.171
		95% BCA Bootstrap UCL	0.182

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.055	Data appear Normal at 5% Significance Level
Theta Star	0.201	
nu star	8.438	
A-D Test Statistic	0.466	Nonparametric Statistics
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method
K-S Test Statistic	0.659	Mean 0.152
5% K-S Critical Value	0.396	SD 0.0622
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.0248
		95% KM (t) UCL 0.194
Assuming Gamma Distribution		95% KM (z) UCL 0.193
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 0.203

Minimum	0.115	95% KM (bootstrap t) UCL	0.203
Maximum	0.42	95% KM (BCA) UCL	0.42
Mean	0.207	95% KM (Percentile Bootstrap) UCL	0.208
Median	0.207	95% KM (Chebyshev) UCL	0.26
SD	0.0497	97.5% KM (Chebyshev) UCL	0.307
k star	19.42	99% KM (Chebyshev) UCL	0.399
Theta star	0.0107		
Nu star	1088	**Potential UCLs to Use**	
AppChi2	1012	95% KM (t) UCL	0.194
95% Gamma Approximate UCL	0.223	95% KM (Percentile Bootstrap) UCL	0.208
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(b)fluoranthene (Total Soil)

General Statistics

Number of Valid Data	28	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	24
Number of Missing Values	1	Percent Non-Detects	85.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.137	Minimum Detected	-1.987
Maximum Detected	0.55	Maximum Detected	-0.598
Mean of Detected	0.287	Mean of Detected	-1.391
SD of Detected	0.185	SD of Detected	0.604
Minimum Non-Detect	0.37	Minimum Non-Detect	-0.994
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	27
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	96.43%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.876	Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.209	Mean	-1.597
SD	0.0701	SD	0.222
95% DL/2 (t) UCL	0.231	95% H-Stat (DL/2) UCL	0.224

Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Log ROS Method	
Mean in Log Scale	-1.621
SD in Log Scale	0.275
Mean in Original Scale	0.206
SD in Original Scale	0.0769
95% t UCL	0.231
95% Percentile Bootstrap UCL	0.232
95% BCA Bootstrap UCL	0.245

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.08
Theta Star	0.266
nu star	8.64
A-D Test Statistic	0.297
5% A-D Critical Value	0.659
K-S Test Statistic	0.659
5% K-S Critical Value	0.396

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.137
Maximum	0.55
Mean	0.285
Median	0.285
SD	0.0621
k star	21.71
Theta star	0.0131
Nu star	1216
AppChi2	1136
95% Gamma Approximate UCL	0.305
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.212
SD	0.0873
SE of Mean	0.0406
95% KM (t) UCL	0.281
95% KM (z) UCL	0.279
95% KM (jackknife) UCL	0.297
95% KM (bootstrap t) UCL	0.318
95% KM (BCA) UCL	0.289
95% KM (Percentile Bootstrap) UCL	0.298
95% KM (Chebyshev) UCL	0.389
97.5% KM (Chebyshev) UCL	0.466
99% KM (Chebyshev) UCL	0.616

Potential UCLs to Use

95% KM (t) UCL	0.281
95% KM (Percentile Bootstrap) UCL	0.298

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene (Total Soil)

General Statistics

Number of Valid Data	28	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	25
Number of Missing Values	1	Percent Non-Detects	89.29%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.271	Minimum Detected	-1.306
Maximum Detected	0.343	Maximum Detected	-1.07
Mean of Detected	0.303	Mean of Detected	-1.199
SD of Detected	0.0367	SD of Detected	0.119
Minimum Non-Detect	0.36	Minimum Non-Detect	-1.022
Maximum Non-Detect	0.44	Maximum Non-Detect	-0.821

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	28
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.964
5% Shapiro Wilk Critical Value	0.767

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.207
SD	0.0363
95% DL/2 (t) UCL	0.218
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.975
5% Shapiro Wilk Critical Value	0.767

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.588
SD	0.147
95% H-Stat (DL/2) UCL	0.217
Log ROS Method	
Mean in Log Scale	-1.199
SD in Log Scale	0.0669
Mean in Original Scale	0.302
SD in Original Scale	0.0203
95% t UCL	0.309
95% Percentile Bootstrap UCL	0.309
95% BCA Bootstrap UCL	0.309

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.303
SD	0.0299
SE of Mean	0.0212
95% KM (t) UCL	0.339
95% KM (z) UCL	0.338
95% KM (jackknife) UCL	0.346
95% KM (bootstrap t) UCL	0.395
95% KM (BCA) UCL	0.343
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.395
97.5% KM (Chebyshev) UCL	0.435
99% KM (Chebyshev) UCL	0.514

Potential UCLs to Use

AppChi2	N/A	95% KM (t) UCL	0.339
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Data Input for ProUCL
Overburden Groundwater, WWTP 1
PBOW

Sample Location	Sample #	Units	Arsenic	Cobalt	Manganese	D_Manganese	Dinitrotoluene, 2,4-	D_Dinitrotoluene, 2,4-	Dinitrotoluene, 2,6-	D_Dinitrotoluene, 2,6-	Bis(2-ethylhexyl)phthalate
WTP1-MW01	WW3015	ug/L	5	25	564	0	1.7	1	1.7	1	2.4
WTP1-MW02	WW3016	ug/L	5	25	98.9	0	0.38	1	0.4	1	2.4
WTP1-MW03	WW3017	ug/L	5	25	39.5	0	0.19	0	0.19	0	2.4
WTP1-MW01	WW3027A	ug/L	7.7	25	384	0	0.2	0	0.2	0	6.5
WTP1-MW02	WW3028A	ug/L	7.2	1.1	109	0	0.2	1	0.2	1	2.55
WTP1-MW03	WW3029	ug/L	5	25	105	0	0.19	0	0.19	0	2.4

ProUCL Output - Overburden Groundwater
WWTP 1, PBOW

General UCL Statistics for Full Data Sets

User Selected Options

From File	UCL data MW GW.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic - (OB Groundwater)

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	3

Raw Statistics		Log-transformed Statistics	
Minimum	5	Minimum of Log Data	1.609
Maximum	7.7	Maximum of Log Data	2.041
Mean	5.817	Mean of log Data	1.742
Median	5	SD of log Data	0.207
SD	1.275		
Coefficient of Variation	0.219		
Skewness	1.035		

Warning: There are only 3 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.682	Shapiro Wilk Test Statistic	0.676
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6.866	95% H-UCL	7.069
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.95
95% Adjusted-CLT UCL (Chen-1995)	6.908	97.5% Chebyshev (MVUE) UCL	8.875
95% Modified-t UCL (Johnson-1978)	6.902	99% Chebyshev (MVUE) UCL	10.69

Gamma Distribution Test		Data Distribution
k star (bias corrected)	13.67	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.426	
MLE of Mean	5.817	
MLE of Standard Deviation	1.573	

nu star	164
Approximate Chi Square Value (.05)	135.4
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	126
Anderson-Darling Test Statistic	1.125
Anderson-Darling 5% Critical Value	0.697
Kolmogorov-Smirnov Test Statistic	0.426
Kolmogorov-Smirnov 5% Critical Value	0.332

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.046
95% Adjusted Gamma UCL	7.572

Nonparametric Statistics

95% CLT UCL	6.673
95% Jackknife UCL	6.866
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	8.086
97.5% Chebyshev(Mean, Sd) UCL	9.067
99% Chebyshev(Mean, Sd) UCL	11

Potential UCL to Use

Use 95% Student's-t UCL	6.866
or 95% Modified-t UCL	6.902

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt (OB Groundwater)

General Statistics

Number of Valid Observations	6
Number of Distinct Observations	2

Raw Statistics

Minimum	1.1
Maximum	25
Mean	21.02
Median	25
SD	9.757
Coefficient of Variation	0.464
Skewness	-2.449

Log-transformed Statistics

Minimum of Log Data	0.0953
Maximum of Log Data	3.219
Mean of log Data	2.698
SD of log Data	1.275

Warning: There are only 2 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Relevant UCL Statistics

Normal Distribution Test

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.496	Shapiro Wilk Test Statistic	0.496
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	29.04
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	23.31
95% Modified-t UCL (Johnson-1978)	28.38

Assuming Lognormal Distribution

95% H-UCL	606.4
95% Chebyshev (MVUE) UCL	88.22
97.5% Chebyshev (MVUE) UCL	114.4
99% Chebyshev (MVUE) UCL	165.9

Gamma Distribution Test

k star (bias corrected)	0.905
Theta Star	23.23
MLE of Mean	21.02
MLE of Standard Deviation	22.1
nu star	10.85
Approximate Chi Square Value (.05)	4.483
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	3.129
Anderson-Darling Test Statistic	1.781
Anderson-Darling 5% Critical Value	0.707
Kolmogorov-Smirnov Test Statistic	0.521
Kolmogorov-Smirnov 5% Critical Value	0.337
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	50.89
95% Adjusted Gamma UCL	72.9

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	27.57
95% Jackknife UCL	N/A
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	38.38
97.5% Chebyshev(Mean, Sd) UCL	45.89
99% Chebyshev(Mean, Sd) UCL	60.65

Potential UCL to Use 0

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese (OB Groundwater)

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics

Minimum	39.5
Maximum	564
Mean	216.7
Median	107
SD	208.8
Coefficient of Variation	0.963
Skewness	1.21

Log-transformed Statistics

Minimum of Log Data	3.676
Maximum of Log Data	6.335
Mean of log Data	4.984
SD of log Data	0.981

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.8
Shapiro Wilk Critical Value	0.788

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.788

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	388.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	401.9
95% Modified-t UCL (Johnson-1978)	395.5

Assuming Lognormal Distribution

95% H-UCL	1402
95% Chebyshev (MVUE) UCL	581
97.5% Chebyshev (MVUE) UCL	739.9
99% Chebyshev (MVUE) UCL	1052

Gamma Distribution Test

k star (bias corrected)	0.816
Theta Star	265.7
MLE of Mean	216.7
MLE of Standard Deviation	240
nu star	9.787
Approximate Chi Square Value (.05)	3.809
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	2.59
Anderson-Darling Test Statistic	0.514
Anderson-Darling 5% Critical Value	0.709
Kolmogorov-Smirnov Test Statistic	0.335
Kolmogorov-Smirnov 5% Critical Value	0.338

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	556.9
95% Adjusted Gamma UCL	819.1

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	356.9
95% Jackknife UCL	388.5
95% Standard Bootstrap UCL	342.6
95% Bootstrap-t UCL	1156
95% Hall's Bootstrap UCL	2002
95% Percentile Bootstrap UCL	349
95% BCA Bootstrap UCL	356.6
95% Chebyshev(Mean, Sd) UCL	588.3
97.5% Chebyshev(Mean, Sd) UCL	749
99% Chebyshev(Mean, Sd) UCL	1065

Potential UCL to Use — Use 95% Student's-t UCL 388.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Bis(2-ethylhexyl)phthalate (OB Groundwater)

General Statistics

Number of Valid Observations 6

Number of Distinct Observations 3

Raw Statistics

Minimum	2.4
Maximum	6.5
Mean	3.108
Median	2.4
SD	1.663
Coefficient of Variation	0.535
Skewness	2.442

Log-transformed Statistics

Minimum of Log Data	0.875
Maximum of Log Data	1.872
Mean of log Data	1.052
SD of log Data	0.403

Warning: There are only 3 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.519
Shapiro Wilk Critical Value	0.788

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.534
Shapiro Wilk Critical Value	0.788

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	4.476

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4.948
95% Modified-t UCL (Johnson-1978)	4.589

Assuming Lognormal Distribution

95% H-UCL	4.799
95% Chebyshev (MVUE) UCL	5.251
97.5% Chebyshev (MVUE) UCL	6.199
99% Chebyshev (MVUE) UCL	8.061

Gamma Distribution Test

k star (bias corrected)	3.224
Theta Star	0.964
MLE of Mean	3.108
MLE of Standard Deviation	1.731
nu star	38.69
Approximate Chi Square Value (.05)	25.44
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	21.64
Anderson-Darling Test Statistic	1.58
Anderson-Darling 5% Critical Value	0.698
Kolmogorov-Smirnov Test Statistic	0.467
Kolmogorov-Smirnov 5% Critical Value	0.333

Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	4.225
95% Jackknife UCL	4.476
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	6.067

97.5% Chebyshev(Mean, Sd) UCL	7.347
99% Chebyshev(Mean, Sd) UCL	9.862

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.727
95% Adjusted Gamma UCL	5.556

Potential UCL to Use

Use 95% Student's-t UCL	4.476
or 95% Modified-t UCL	4.589

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	UCL data MW GW.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dinitrotoluene, 2,4- (OB Groundwater)

General Statistics

Number of Valid Data	6	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	3
		Percent Non-Detects	50.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.2	Minimum Detected	-1.609
Maximum Detected	1.7	Maximum Detected	0.531
Mean of Detected	0.76	Mean of Detected	-0.682
SD of Detected	0.819	SD of Detected	1.098
Minimum Non-Detect	0.19	Minimum Non-Detect	-1.661
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	50.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.949
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.428
SD	0.633
95% DL/2 (t) UCL	0.949
Maximum Likelihood Estimate(MLE) Method	
Mean	0.101
SD	0.903
95% MLE (t) UCL	0.844
95% MLE (Tiku) UCL	1.022

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.509
SD	1.142
95% H-Stat (DL/2) UCL	4.498
Log ROS Method	
Mean in Log Scale	-2.512
SD in Log Scale	2.167
Mean in Original Scale	0.388
SD in Original Scale	0.659
95% t UCL	0.93
95% Percentile Bootstrap UCL	0.885
95% BCA Bootstrap UCL	0.949

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.48
SD	0.55
SE of Mean	0.275
95% KM (t) UCL	1.034
95% KM (z) UCL	0.932
95% KM (jackknife) UCL	0.955
95% KM (bootstrap t) UCL	2.652
95% KM (BCA) UCL	1.7
95% KM (Percentile Bootstrap) UCL	1.7
95% KM (Chebyshev) UCL	1.678
97.5% KM (Chebyshev) UCL	2.196
99% KM (Chebyshev) UCL	3.214

Potential UCLs to Use

95% KM (t) UCL	1.034
95% KM (Percentile Bootstrap) UCL	1.7

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Dinitrotoluene, 2,6- (OB Groundwater)

General Statistics

Number of Valid Data	6	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	3

Percent Non-Detects	50.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.2	Minimum Detected	-1.609
Maximum Detected	1.7	Maximum Detected	0.531
Mean of Detected	0.767	Mean of Detected	-0.665
SD of Detected	0.814	SD of Detected	1.092
Minimum Non-Detect	0.19	Minimum Non-Detect	-1.661
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	50.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Test Statistic	0.96
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.432	Mean	-1.501
SD	0.632	SD	1.147
95% DL/2 (t) UCL	0.952	95% H-Stat (DL/2) UCL	4.652
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.105	Mean in Log Scale	-2.491
SD	0.904	SD in Log Scale	2.162
95% MLE (t) UCL	0.849	Mean in Original Scale	0.391
95% MLE (Tiku) UCL	1.027	SD in Original Scale	0.659
		95% t UCL	0.933
		95% Percentile Bootstrap UCL	0.887
		95% BCA Bootstrap UCL	1.017

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	**Nonparametric Statistics**
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method
K-S Test Statistic	N/A	Mean 0.483

5% K-S Critical Value	N/A	SD	0.549
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.274
		95% KM (t) UCL	1.036
Assuming Gamma Distribution		95% KM (z) UCL	0.935
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.959
Minimum	N/A	95% KM (bootstrap t) UCL	2.436
Maximum	N/A	95% KM (BCA) UCL	1.7
Mean	N/A	95% KM (Percentile Bootstrap) UCL	1.7
Median	N/A	95% KM (Chebyshev) UCL	1.68
SD	N/A	97.5% KM (Chebyshev) UCL	2.198
k star	N/A	99% KM (Chebyshev) UCL	3.215
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	1.036
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	1.7
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

APPENDIX C

TOXICOLOGICAL PROFILES

Introduction to the Toxicological Profiles

1.0 Purpose and Use of the Toxicological Profiles

Human health toxicological profiles are presented for each chemical of potential concern (COPC), each chemical for which documentation of chemical-specific values is required or about which there are chemical-specific issues that require resolution. The toxicological profiles provide documentation of the chemical-specific physical properties and toxicity values used in the risk assessment (RA). They also discuss the identity, classification and uses of the chemical, the common sources of release to the environment and the fate of the chemical in the environment, including the relevance of aquatic and terrestrial food-chain pathways to human health. A brief review of toxicokinetics discusses absorption, distribution, metabolism or biotransformation, excretion of the parent compound and metabolites, and mechanism of toxicity including identifying the ultimate toxicant – i.e., the moiety (parent chemical or metabolite) identified as most likely responsible for the adverse effects associated with the chemical. This information may be helpful to determine whether laboratory animals may serve as appropriate models for toxicity to humans, and to clarify the nature of toxicological interactions with other chemicals. A discussion of dermal exposure provides perspective on the significance of dermal uptake, and documents the development of dermal toxicity values and the extent or rate of dermal uptake from soil or water according to the latest USEPA (2004) guidance.

The noncancer effects evaluation and carcinogenicity evaluation provide an overall perspective on the nature of the adverse effects associated with the chemical, as well as documentation of the toxicity values. Chemical-specific issues or controversies that may influence the interpretation or application of the results of the RA are also discussed herein. The toxicity values used in the RA are summarized in a table.

The overall purpose of the toxicological profiles is to provide perspective on characteristics of each of the chemicals included in the RA so that the numerical risk estimates can be interpreted and applied wisely in the management of the site.

2.0 Chemical Identity

The identity of the chemical or chemical class is given in the title of each profile; additional information or clarification is provided in the *Introduction and Physical Properties* Section as required. The hyphenated number in parentheses following the chemical name is its unique Chemical Abstract Service (CAS) registration number. The CAS number may be located in the profile title, text, or in the case of multiple isomers or members of a chemical class, in the table that provides the physical properties.

3.0 Physical Properties

The toxicological profiles also provide documentation for the physical properties or constants that are important for chemical transport modeling, such as molecular weight (MW) in grams per mole (g/mole), the log of the octanol/water partition coefficient (log K_{ow}), Henry's Law constant (H) in atmosphere-cubic meters per mole (atm-m^3/mole), the soil/water partition coefficient (K_d) in liters per kilogram (L/kg) for metals, the log of the soil/organic carbon partition coefficient (log K_{oc}) (unitless) for organic chemicals, diffusivity in air (D_a) in square centimeters per second (cm^2/s), diffusivity in water (D_w) in cm^2/s, vapor pressure (VP) in atmospheres (atm), solubility

in water (S) in milligrams per liter (mg/L), and, for volatile organic compounds (VOC), boiling point of pure compound (T_b) in degrees Kelvin (°K), critical temperature (T_c) in °K, and enthalpy of vaporization at the boiling point ($\Delta H_{v,b}$) in calories per mole (cal/mol). Organic chemicals are designated as VOCs or semivolatile organic compounds (SVOC) based on their propensity to volatilize from environmental media. Chemicals designated as VOCs generally have an H greater than 1E-5 atm-m^3/mole (EPA, 2002).

The physical constants generally are taken from the most reliable source (i.e., the source that provides the highest level of documentation). Values for interrelated properties are usually taken from the same source (e.g., H is often estimated from VP and S; therefore, the same source is generally used for all three property values). When one source provides several values for a given property, professional judgment is used to select the most appropriate. Obvious outliers may be dropped from consideration. The average or the midpoint of a range of values may be selected. K_d values for metals and K_{oc} values for ionizing organic compound are based on a default pH of 6.8 (EPA, 2002) if the data are available. VP, S and H values are limited to those provided for normal ambient temperatures (0 to 30 °C) and the reference temperature is provided.

When values for H are not located, they are calculated as follows, provided the requisite information is available (EPA, 1998):

$$H = \frac{VP \bullet MW}{S}$$

where:

H	=	Henry's law constant (atm-m^3/mole, calculated)
VP	=	vapor pressure (atm)
MW	=	molecular weight (g/mole)
S	=	solubility in water (mg/L).

When values for K_{oc} are not located, they are calculated as follows for phthalates and polyaromatic aromatic hydrocarbons (PAH) provided log K_{ow} is available (EPA, 1998):

$$\log K_{oc} = 0.97 \log K_{ow} - 0.094$$

where:

K_{oc}	=	soil/organic carbon partition coefficient (unitless, calculated)
K_{ow}	=	octanol/water partition coefficient (unitless).

K_{oc} for other organic chemicals is calculated as follows provided log K_{ow} is available (EPA, 1998):

$$\log K_{oc} = 0.78 \log K_{ow} + 0.151$$

where:

K_{oc} = soil/organic carbon partition coefficient (unitless, calculated)
K_{ow} = octanol/water partition coefficient (unitless).

When values for D_a are not located, they are calculated as follows (EPA, 1998):

$$D_a = \frac{1.9}{MW^{2/3}}$$

where:

D_a = diffusivity in air (cm^2/s, calculated)
MW = molecular weight (g/mole).

When values for D_w are not located, they are calculated as follows (EPA, 1998):

$$D_w = \frac{22E{-}5}{MW^{2/3}}$$

where:

D_w = diffusivity in water (cm^2/s, calculated)
MW = molecular weight (g/mole).

Values for T_b, T_c and $\Delta H_{v,b}$ for VOCs are preferentially taken from EPA (2004), unless there is evidence that values provided by other sources (HSDB, 2011; NIST, 2011) are more reliable. If values are not located for these variables, they may be estimated by the most appropriate technique for the specific chemical or class to which it belongs as recommended by Lyman et al. (1990). The estimation method used is identified by footnote in the table of physical properties.

4.0 Environmental Release, Fate and Transport

The toxicological profiles also present the predominant sources of release to the environment as well as a qualitative or semi-quantitative description of the fate and transport of the chemical in air, water, sediment, and soil. No attempt is made to present detailed quantitative data because environmental fate is usually highly dependent on climatic conditions and the characteristics of the medium of interest, both of which may differ from location to location and change from time to time. The source and fate information may provide perspective regarding the likelihood that the chemical's presence is related to site activities, that the chemical will migrate across media, or that the chemical will persist at toxicologically significant levels.

Biotransfer factors are provided for chemicals for which food-chain pathways may be significant, which includes a few inorganic chemicals and those organic chemicals that are highly lipophilic, persist in the environment, and are resistant to metabolism by lower trophic organisms in the food chain. High lipophilicity is indicated by a log K_{ow} greater than 3 (Lyman et al., 1990). Lipophilicity enhances partitioning to biomedia and passage across biological

membranes. Persistence in the environment is evidence that the chemical might resist biotransformation and, therefore, remain in edible tissues at toxicologically significant concentrations. Toxicokinetic data, when available, clarify the potential for biotransfer. Biotransformation products may be more toxic than the parent compound, but they tend to be short-lived or more quickly removed from the body, reducing the likelihood of significant bioaccumulation. Similarly, VOCs tend to be mobile and labile (i.e., subject to rapid and extensive biotransformation and excretion), and generally do not participate significantly in food-chain pathways. Therefore, biotransfer factors are not estimated for VOCs, with few exceptions. Some SVOCs, however, are highly lipophilic and may persist. Biotransfer factors generally are not estimated unless empirical data suggest that participation in food-chain pathways is likely to be significant.

The biotransfer factors of interest are water-to-fish bioconcentration factors (BCF) or bioaccumulation factors (BAF), or biota-sediment accumulation factors (BSAF), soil-to-plant biotransfer factors (Bp), cattle ingestion-to-beef factors (Bb) and cattle ingestion-to-milk factors (Bm). Separate soil-to-plant biotransfer factors are available for the reproductive parts of plants (e.g., fruits, seeds) and the vegetative parts of plants (e.g., stems, leaves) for inorganic and some organic chemicals. Soil-to-plant factors for the reproductive parts of plants are designated Bpr; soil-to-plant factors for the vegetative parts of plants are designated Bpv.

Most chemicals in surface water bodies remain predominantly in the dissolved phase in the water column or partition to sediment, which generally settles to the bottom. The difference in concentration between surface water and sediment is usually upwards of an order of magnitude. Theoretically it is appropriate to evaluate biotransfer from both media, using BCF to quantify uptake from water and BSAF to quantify uptake from sediment. Quantification of biotransfer, however, is accompanied by considerable uncertainty and variability because field conditions cannot be readily duplicated in the laboratory where BCF values are generally measured. Therefore, the biotransfer models for either medium are intentionally designed to be very conservative to ensure protection of human health. Consequently, evaluating biotransfer from both water and sediment captures the conservatism of both models and is likely to grossly overestimate total biotransfer. Therefore, most chemicals with the potential to participate significantly in aquatic food chain pathways are evaluated for bioconcentration from surface water *or* bioaccumulation from sediment, depending on which pathway is expected to predominate, but not both.

BCF values are adopted from empirical data when the data are clearly the best choice (i.e., similar results in multiple species of fin fish). When the empirical data are few or inconsistent, BCFs for inorganic chemicals are taken from various sources. BCF values for organic chemicals are generally estimated from the Bintein and Devillers model (Devillers et al., 1996):

$$\log BCF = 0.910 \log K_{ow} - 1.975 \log(6.8E{-}7 K_{ow} + 1) - 0.786$$

where:

BCF = bioconcentration factor (L/kg, calculated)
K_{ow} = octanol/water partition coefficient (unitless).

The Bintein and Devillers model is selected over simpler models adopted by the EPA largely because the Bintein and Devillers approach has undergone scrutiny since first published (Bintein and Devillers, 1993), and considerable effort was expended to validate the model; i.e., to compare modeled and empirical results. The Bintein and Devillers model is probably more realistic than simpler models, particularly for chemicals with higher log K_{ow} values. BSAF values are chosen instead of BCFs for those very highly lipophilic chemicals such as the polychlorinated biphenyls (PCB), polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF) and selected organochlorine pesticides expected to partition almost entirely to benthic sediment.

Soil-to-plant biotransfer factors (Bp) for SVOCs are estimated by a simple model by Travis and Arms (1988), which is based only on log K_{ow}:

$$\log Bp = 1.588 - 0.578 \log K_{ow}$$

where:

Bp = soil-to-plant biotransfer factor (unitless, calculated)
K_{ow} = octanol/water partition coefficient (unitless).

Separate biotransfer factors are not estimated for the reproductive parts of plants (Bpr) and the vegetative parts of plants (Bpv) by the Travis and Arms model.

Cattle ingestion-to-beef factors (Bb) for SVOCs are estimated by a simple model by Travis and Arms (1988), which is based only on log K_{ow}:

$$\log Bb = -7.6 + \log K_{ow}$$

where:

Bb = cattle ingestion-to-beef biotransfer factor (days/kg, calculated)
K_{ow} = octanol/water partition coefficient (unitless).

Cattle ingestion-to-milk factors (Bm) for SVOCs are estimated by a simple model by Travis and Arms (1988), which is based only on log K_{ow}:

$$\log Bm = -8.10 + \log K_{ow}$$

where:

Bm = cattle ingestion-to-milk biotransfer factor (days/kg, calculated)
K_{ow} = octanol/water partition coefficient (unitless).

It should be understood that the biotransfer models described above depend only on one or two physical property values that are related largely to the propensity for transfer across biological membranes. Many compounds have relatively large log K_{ow} values, indicating ready passage across membranes; however, they are sufficiently volatile, or are otherwise mobile or labile so

they are unable to persist in biological tissues. For example, many constituents with high log K_{ow} values are efficiently metabolized by lower trophic organisms in the food chain so that significant human exposure does not occur. Such is the case for practically all VOCs and most SVOCs; relatively few compounds participate significantly in food-chain pathways. Therefore, biotransfer is evaluated as a potential pathway only for those chemicals with empirical data that indicate food-chain exposure could be significant.

5.0 Toxicokinetics

A toxicokinetics section was added to the toxicological profiles in early 2004. Toxicokinetics describes the uptake or absorption of the chemical from contact media, the distribution of the chemical (or its metabolites) within the body following absorption, the metabolism or biotransformation of the chemical, and the mechanisms of excretion of the parent compound and its biotransformation products from the body. The toxicokinetics section documents the gastrointestinal (GI) absorption factor (GAF) required to develop toxicity factors for dermal exposure, because dermal risk characterization depends on an absorbed dose rather than an exposure dose. The toxicokinetics section also identifies the compounds that are rapidly metabolized or eliminated, which justifies excluding their evaluation in food-chain pathways even though they may have a large K_{ow} that indicates ready passage across cell membranes. This section also tries to identify the ultimate toxicant and elucidate the most important mechanism(s) of toxicity.

6.0 Dermal Exposure

The toxicological profiles provide the documentation for the GAF, which is used to develop the dermal toxicity values. The toxicological profiles also provide documentation for the dermal absorption factor (ABS), which describes the extent of dermal uptake from soil, and the time for dermal uptake to reach steady state (t*), the permeability coefficient (K_p), the lag time for chemical to cross the stratum corneum (τ), the fraction absorbed (FA), and the ratio of the permeability coefficient for passage across the stratum corneum to the permeability coefficient for passage across the viable epidermis (B), all which are used to estimate the rate of dermal uptake from water. These values are taken from EPA (2004) if available. Otherwise, they are estimated by the EPA (2004) methods.

7.0 Toxicity Evaluation

The toxicological profile contains a brief description of the nature of the adverse effects associated with the chemical. It is important to note that a discussion of adverse effects without a discussion of dose is incomplete and potentially misleading, because virtually any chemical may be toxic at some dose, and many chemicals (e.g., nutritionally required minerals, vitamins, amino acids, etc.) enhance human health at some low dose. An ever growing and compelling body of evidence suggests that many environmental contaminants also enhance health at low doses (Hart and Frame, 1996).

7.1 Noncancer Evaluation

The toxicity values for noncancer effects include a reference dose (RfD) expressed in milligrams per kilogram per day (mg/kg-day) for chronic or subchronic oral exposure, and a reference concentration (RfC), in milligrams per cubic meter (mg/m^3), for chronic or subchronic inhalation exposure. The inhalation RfC in units of mg/m^3 may be converted to an equivalent inhalation

RfD by assuming continuous chronic exposure of humans with a body weight of 70 kg and an inhalation rate of 20 m^3/day (EPA, 1989, 1991). In other words, the RfC expressed as mg/m^3 is multiplied by the inhalation rate of 20 m^3/day, and the result is divided by the assumed adult body weight of 70 kg to yield an inhalation RfD expressed as mg/kg-day.

RfD and RfC values are usually derived from empirical benchmark doses (BMD) or concentrations called no-observed-effect levels (NOEL) or no-observed-adverse-effect levels (NOAEL) from animal toxicity or human epidemiology studies. If the data do not permit identifying a NOEL or NOAEL, a lowest-observed-adverse-effect level (LOAEL) or lowest-effect level (LEL) may be used. A frank-effect level (FEL), e.g., mortality, shortened life span or serious physiologic, neurologic or behavioral disturbances, is generally considered an inappropriate benchmark from which to develop an RfD or RfC. Some RfD and RfC derivations employ a BMD that is a statistically estimated dose for humans at which some low proportion of the population may experience some minimally adverse effect. A BMD at which 10 percent of the population may be expected to experience such an effect is expressed as BMD_{10}. The RfD or RfC is derived by dividing the benchmark level (e.g., NOAEL or BMD_{10}) by a series of uncertainty and modifying factors, which collectively are designated the uncertainty factor (UF).

RfD and RfC values are not currently available for acute toxicity and acute exposure is not evaluated in the RA. Nonetheless, the levels associated with acute lethality and data regarding the effects of acute exposure to levels higher than ordinarily observed in chronic environmental exposure provide additional perspective regarding the toxicity of the chemical. Therefore, information regarding acute toxicity, when available, is included in the profiles. Lethality data for laboratory animals are generally expressed as the oral dose associated with lethality of 50 percent of an exposed population (LD_{50}) or the concentration in air associated with lethality of 50 percent of an exposed population (LC_{50}). Occasionally the dose associated with lethality in a low percentage of an exposed population (LD_{LO}) is presented.

RfD and RfC values are derived for both chronic and subchronic exposure. For purposes of the RA, chronic exposure is defined as equal to or greater than 7 years, i.e., at least 10 percent of expected life span; subchronic exposure is defined as 2 weeks to 7 years.

Under the assumption of monotonicity (i.e., incidence, intensity, or severity of effects can increase, but cannot decrease, with increasing magnitude or duration of exposure), a chronic RfD may be considered sufficiently protective for subchronic exposure, but a subchronic RfD may not be protective for chronic exposure. Currently, verified subchronic RfD values are unavailable. Provisional subchronic RfDs exist for few chemicals and are compiled in the Health Effects Assessment Summary Tables (HEAST) (EPA, 1997) and some National Center for Environmental Assessment (NCEA) or Provisional Peer Reviewed Toxicity Value (PPRTV) derivations. Although once updated semi-annually, the HEAST is no longer updated, because the EPA (2005) Integrated Risk Information System (IRIS) is generally considered the source of the highest quality toxicity values. For some chemicals the PPRTV derivations are more recent and it is known that summaries on IRIS will be replaced with the PPRTV derivations. In these cases the PPRTV values will be selected preferentially to those on IRIS. Subchronic RfD and RfC values are generally obtained from EPA (1997) or more recent NCEA or PPRTV evaluations, or they may be derived *de novo* from the toxicological data set or from chronic RfD values as follows:

- If the UF applied in the derivation of the chronic RfD does not provide for expansion from subchronic to chronic exposure (e.g., if the chronic RfD was derived from a chronic study), the chronic RfD is adopted as being sufficiently protective for subchronic exposure.

- If the UF applied in the derivation of the chronic RfD contains a component to expand from subchronic to chronic exposure, the subchronic RfD is derived by multiplying the chronic RfD by the component of the UF used to expand from subchronic to chronic exposure (e.g., if a factor of 10 was used to expand from subchronic to chronic exposure, the subchronic RfD will be 10 times larger than the chronic RfD).

7.2 Carcinogenicity Evaluation

The evaluation of the potential carcinogenicity of a chemical includes both a qualitative and a quantitative aspect (EPA, 1986, 2005). EPA (2005) recognizes five weight-of-evidence group classifications for carcinogenicity. Formerly, EPA (1986) used a letter-based system to describe the weight of evidence for carcinogenicity. Reference to this former system is included because many of the carcinogenicity assessments listed on the Integrated Risk Information System (IRIS) use the former letter-based system (EPA, 2011). The five EPA weight-of-evidence classifications are as follows:

- ***Carcinogenic to Humans*** (corresponds to the former Group A - Human Carcinogen).

- ***Likely to be Carcinogenic to Humans*** (includes both the former Group B1 and Group B2-Probable Human Carcinogens)

- ***Suggestive Evidence of Carcinogenic Potential*** (corresponds to the former Group C - Possible Human Carcinogen)

- ***Inadequate Information to Assess Carcinogenic Potential*** (corresponds to the former Group D - Not Classifiable as to Human Carcinogenicity)

- ***Not Likely to be Carcinogenic to Humans*** (corresponds to the former Group E - Evidence of Noncarcinogenicity to Humans).

Toxicity values for cancer risk include a slope factor (SF) for oral exposure, expressed as the risk per mg/kg-day ingested dose, and a unit risk factor (URF) for inhalation exposure, expressed as the risk per microgram per cubic meter ($\mu g/m^3$) in ambient air. These quantitative estimates are generally provided for chemicals in EPA weight-of-evidence Groups A, B and C if the data are adequate. The SF or URF is usually estimated as an upper bound on the slope of the dose- or concentration-response curve from animal toxicity or human epidemiology studies. The inhalation URF in units of risk per $\mu g/m^3$ may be converted to an equivalent inhalation SF in units of risk per mg/kg-day by assuming continuous lifetime exposure of humans with a body weight to 70 kg and an inhalation rate of 20 m^3/day. In other words, the URF expressed as risk per $\mu g/m^3$ is divided by the inhalation rate of 20 m^3/day, and multiplied by the assumed body weight of 70 kg and a conversion factor of 1000 $\mu g/mg$.

EPA (1986, 2005) generally assumes that there are no thresholds for carcinogenic expression; therefore, any exposure represents some quantifiable risk. A few potential carcinogens are understood to require a threshold for carcinogenic expression. Such chemicals are more appropriately evaluated with an RfD developed as described above.

7.3 Hierarchy for Selecting Toxicity Data

Toxicity values generally are chosen using the following hierarchy:

- The EPA's (2011) on-line IRIS database containing toxicity values that have undergone the most rigorous Agency review.
- PPRTV derivations for the Superfund Technical Support Center (STSC); there may be individual chemicals for which the PPRTV derivations supercede those on IRIS.
- Older NCEA derivations for the STSC, HEAST (EPA, 1997), or other EPA documents or memoranda.

When EPA-derived toxicity values are not located in any of the above sources, Minimal Risk Levels (MRL) from the Agency for Toxic Substances Disease Registry (ATSDR) toxicological profiles may be adopted or adapted for use in the RA. MRLs are derived by a methodology similar to the EPA methodology for RfD derivation. ATSDR toxicological profiles generally identify levels significant to human health with particular emphasis on target organ and mechanism of toxicity. Also, the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) has derived toxicity values for certain chemicals (and their degradation products) associated with military use. Finally, the primary literature may be surveyed to determine whether sufficient data exist to derive a toxicity value using the EPA methodology. The use of surrogate chemicals is also considered if the chemical structure, adverse effects, and toxic potency of the surrogate and chemical of interest are judged to be sufficiently similar.

GAFs, used to derive dermal RfD values and SFs from the corresponding oral toxicity values, are obtained from the following hierarchy:

- EPA (2004)
- Empirical data
- PPRTV summaries or NCEA position papers
- Federal agency reviews of the empirical data, such as ATSDR toxicological profiles and various EPA criteria documents
- Other published reviews of the empirical data.

8.0 References

Bintein, S. and J. Devillers, 1993, "Nonlinear Dependence of Fish Bioconcentration on n-Octanol/Water Partition Coefficient," ***SAR and QSAR in Environmental Research***, 1: 29-39.

Devillers, J., S. Bintein and D. Domine, 1996, "Comparison of BCF Models Based on Log P," ***Chemosphere***, 33(6): 1047-1065.

Hart, R.W. and L.T. Frame, 1996, "Toxicological Defense Mechanisms and How They May Affect the Nature of Dose-Response Relationships," ***Biological Effects of Low Level Exposure (BELLE) Newsletter***, 5(1): 1-16.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

Lyman, W.J., W.F. Reehl and D.H. Rosenblatt, 1990, ***Handbook of Chemical Property Estimation Methods, Environmental Behavior of Organic Compounds***, American Chemical Society, Washington, D.C.

National Institute of Standards and Technology (NIST), 2011, ***NIST Chemistry WebBook***, on line.

Travis, C.C. and A.D. Arms, 1988, "Bioconcentration of Organics in Beef, Milk and Vegetation," ***Environmental Science and Technology***, 22(3): 271-274.

U.S. Environmental Protection Agency (EPA), 1986, "Guidelines for Carcinogen Risk Assessment," ***Federal Register***, 51(185): 33992-34003.

U.S. Environmental Protection Agency (EPA), 1989, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002, December.

U.S. Environmental Protection Agency (EPA), 1991, ***Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors***, Interim Final, Office of Solid Waste and Emergency Response, OSWER Directive: 9285.6-03, 25 March.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 1998, ***Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Volume Two***, Peer Review Draft, Office of Solid Waste and Emergency Response, Washington, D.C., EPA530-D-98-001B, July.

U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2005, ***Guidelines for Carcinogen Risk Assessment***, Risk Assessment Forum, Washington, D.C., March, EPA/630/P-03/001B.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

METALS

ARSENIC (7440-38-2)

1.0 Introduction and Physical Properties

Arsenic is a natural **metalloid**, the 20th most abundant element in the earth's crust that occurs in both inorganic and organic forms (ATSDR, 2000; HSDB, 2011). Elemental arsenic is a steel-grey material that may occur naturally. However, arsenic is usually found in the environment combined with other elements such as oxygen, chlorine, and sulfur. Most inorganic and organic arsenic compounds are non-volatile, odorless and tasteless white or colorless powders. Inorganic arsenic occurs naturally in soil and in many kinds of rock, especially in minerals and ores that contain copper or lead. Inorganic arsenic is more toxic than organic forms. Major uses of arsenic in the U.S. include its incorporation into wood preservatives and other agricultural chemicals. It is also used as a metal in various electrical devices and is alloyed with lead and copper in the manufacture of lead bullets or shot (Lewis, 1997). Arsenic is also a component of the chemical warfare agent Lewisite (Opresko et al., 1998). Lewisite is manufactured by the condensation of arsenic trichloride with acetylene in the presence of aluminum, copper or mercuric chloride (Lewis, 1997). Relevant physical properties are compiled below:

MW	log K_{ow}	H	K_d	D_a	D_w	VP	S
74.92[a]	NA	NA	2.9E+1[b]	NA	NA	Note 1[c]	Note 2[c]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; K_d = soil/water partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; NA = not applicable.
Note 1: Variable: inorganic arsenic compounds are not likely to volatilize; some organic arsenic compounds are low-boiling liquids or gases at normal temperatures.
Note 2: Variable: inorganic arsenic compounds range from practically insoluble to freely miscible in water; most organic arsenic compounds are not readily soluble, most arsenic acid compounds are soluble to freely miscible.
[a] Hazardous Substance Data Bank (HSDB), 2004, National Library of Medicine, on line, accessed 21 April.
[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***,, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.
[c]Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Arsenic***, U.S. Public Health Service, Atlanta, Georgia, September, on line.

2.0 Environmental Fate and Transport

The production of arsenic and its use in nonferrous alloys and in the manufacture of semiconductors may result in its release to the environment through various waste streams HSDB, 2011). Other important anthropogenic releases are metal smelting, coal burning, and other industrial activities. Arsenic may be present at military sites as a result of training with or demilitarization or disposal of Lewisite. Most (approximately 80 percent) of anthropogenic releases are initially to soil (ATSDR, 2000).

Arsenic occurs in the air as a combination of trivalent and pentavalent forms almost entirely adsorbed to small particles that permit dispersion over long distances (ATSDR, 2000). Residence time in the atmosphere averages approximately nine days. Removal is largely by wet and dry deposition. Arsenic in surface water can undergo a variety of reactions and exist as several different soluble compounds. Sorption to sediment is often an important removal process, but biotransformation in sediment may return soluble forms to the water. Arsenic in soil generally

exists as insoluble forms sorbed to clay or organic matter or complexed with calcium or iron. Mobility is low and leaching is not generally significant, except that increasing soil pH can dramatically increase solubility and mobility.

Arsenic has been shown to bioconcentrate in aquatic organisms, mainly at the water-algae interface (ATSDR, 2000). There is no evidence for biomagnification through the various trophic levels, nor do there appear to be significant differences between bottom-feeders and predatory fish. Arsenic is among the metals listed as being of no concern for bioaccumulation in fish (EPA, 1995). Empirical data suggest that bioconcentration through terrestrial food chain pathways is unlikely to be significant (ATSDR, 2000). Therefore, biotransfer factors are not developed for arsenic.

3.0 Toxicokinetics

All forms of inorganic arsenic are readily absorbed by the lungs and GI tract; the extent of absorption is greater for more soluble compounds than for more insoluble compounds (ATSDR, 2000). Dermal absorption has not been well characterized but is significantly less than inhalation or oral absorption. GI and dermal absorption of arsenic from soil is much lower than from aqueous solution. Distribution is generally widespread throughout the body following absorption.

Metabolism of inorganic arsenic involves reduction of As^{+5} to As^{+3}, and oxidation of As^{+3} to As^{+5} so that arsenic is present systemically as a mixture of arsenate and arsenite (ATSDR, 2000). Arsenite is readily oxidized and methylated primarily in the liver to form the organic compounds monomethyl arsonic acid and dimethyl arsinic acid, which are rapidly excreted in the urine.

4.0 Dermal Exposure

EPA (2004) concluded that a GAF should not be estimated for the purpose of adjusting oral toxicity values for dermal exposure. Therefore, the oral toxicity values described below are used directly without adjustment for evaluating dermal exposure.

EPA (2004) cites empirical data indicating that dermal uptake of arsenic from soil approximates 3 percent. The ABS of 0.03 recommended by EPA (2004) is used herein. Empirical data regarding the uptake of soluble forms of arsenic from water were not located. The EPA (2004) default K_p for inorganic chemicals of 1E-3 cm/hour is selected for arsenic.

5.0 Noncancer Effects Evaluation

Inorganic arsenic may be an essential nutrient, at least for food-producing domestic animals, exerting beneficial effects on growth, health and feed conversion efficiency (Underwood, 1977). A lethal dose of arsenic trioxide in humans is 70-180 mg, approximately 50 to 140 mg arsenic (Ishinishi et al., 1986). Acute oral exposure of humans to high doses of arsenic produces liver swelling, skin lesions, disturbed heart function and neurological effects. The only noncancer effects in humans clearly attributable to chronic oral exposure to arsenic are dermal hyper pigmentation and keratosis, as revealed by studies of several hundred Chinese exposed to naturally occurring arsenic in well water (EPA, 2011). Similar effects were observed in persons exposed to high levels of arsenic in water in Utah and the northern part of Mexico. EPA (2011) verified an RfD of 3E-4 mg/kg-day for chronic oral exposure, based on a NOAEL of 8E-4 mg/kg-day for hyper pigmentation and kertatosis of the skin from the Chinese data. An uncertainty factor of 3 was applied. An increased incidence of Blackfoot disease was also

observed, which may not be related to arsenic alone. Goyer (1991) describes black-foot disease as a peripheral vascular disorder manifested as acrocyanosis and Raynaud's disease, which may progress to gangrene. EPA (2011) notes that the skin is the more sensitive target organ. Nonetheless, in keeping with EPA (1989) guidance regarding selection of target organ, both the skin and peripheral vascular system are selected as target organs for prolonged oral exposure to arsenic. Confidence in the RfD is medium.

The available data do not suggest a significant difference between chronic and subchronic exposure regarding the threshold for noncancer effects. Therefore, EPA (1997) adopted the chronic oral RfD as the provisional subchronic oral RfD for arsenic.

Occupational (predominantly inhalation) exposure is also associated with neurological deficits, anemia, and vascular effects (Ishinishi et al., 1986). However, concomitant exposure to other chemicals cannot be ruled out in the occupational studies. Therefore, the data are not sufficient for estimation of an inhalation RfC.

6.0 Carcinogenicity Evaluation

Inorganic arsenic is clearly a carcinogen in humans. Inhalation exposure is associated with increased risk of lung cancer in persons employed as smelter workers, in arsenical pesticide applicators, and in a population residing near a pesticide manufacturing plant (EPA, 2011). Oral exposure to high levels in well water is associated with increased risk of skin cancer and several forms of internal cancer, although the role of other chemicals in the internal cancers is unclear. Extensive animal testing with various forms of arsenic given by many routes of exposure to several species, however, has not demonstrated the carcinogenicity of arsenic, indicating that the common laboratory animals are not good models for carcinogenicity to humans. EPA (2011) classified inorganic arsenic in cancer weight-of-evidence Group A (human carcinogen), and recommended an oral SF of 1.5E+0 per mg/kg-day, based on the incidence of skin cancer in the Chinese study. EPA (200) noted that arsenic probably functions via several different mechanisms of toxicity not including direct interaction with DNA. These appear to obey thresholds or to generate a non-linear slope that approaches 0 in the low-dose range. The SF probably exaggerates cancer risk in the low dose range associated with most environmental exposures, although the extent is unclear.

An inhalation URF of 4.3E-3 per $\mu g/m^3$, equivalent to an inhalation SF of 1.5E+1 per mg/kg-day, was derived for inorganic arsenic from the incidence of lung cancer in occupationally exposed men (EPA, 2011).

7.0 Toxicity Summary

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
3E-4	3E-4	S, PVS	ND	ND	NA	A	1.5E+0	A	4.3E-3	1.5E+1
sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo =										

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable. Target organ or critical effect abbreviations: S = skin; PVS = peripheral vascular system. [a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.										

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Arsenic***, Draft for Public Comment, U.S. Public Health Service, Atlanta, Georgia, September, on line.

Goyer, R.A., 1991, "Toxic Effects of Metals," in ***Casarett and Doull's Toxicology, The Basic Science of Poisons***, Fourth Edition, Amdur, M.O., J. Doull and C.D. Klaassen, Eds., Pergamon Press, New York, pp. 623-680.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

Ishinishi, N., K. Tsuchiya, M. Vahter and B.A. Fowler, 1986, "Arsenic," In: Friberg, L., G.F. Nordberg and V.B. Vouk, Eds., ***Handbook on the Toxicology of Metals***, Volume II, Second Edition, New York: Elsevier Science Publishers B.V., pp. 43-83.

Lewis, R.J., Sr., 1997, ***Hawley's Condensed Chemical Dictionary***, Thirteenth Edition, John Wiley & Sons, Inc., New York, pp. 92-93.

Opresko, D.M., R.A. Young, R.A. Faust, et al., 1998, "Chemical Warfare Agents: Estimating Oral Reference Doses," ***Reviews in Environmental Contamination and Toxicology***, 156: 1-183.

Underwood, E.J., 1977, ***Trace Elements in Human and Animal Nutrition***, Fourth Edition, New York: Academic Press, pp. 424-429.

U.S. Environmental Protection Agency (EPA), 1989, ***Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002, December.

U.S. Environmental Protection Agency (EPA), 1995, "40 CFR 9, 122, 123, 131, and 132 Final Water Quality Guidance for the Great Lakes System; Final Rule," ***Federal Register***, 60(56); 15366-15425.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

CHROMIUM (7440-47-3)

1.0 Introduction and Physical Properties

Chromium is a naturally occurring **metal** (ATSDR, 2000). It occurs in several valence states; chromium (III) (16065-83-1) and chromium (VI) (18540-29-9) are the forms most commonly encountered in environmental media. Chromium is used largely in the metallurgical, refractory and chemical industries. The largest amount is used in the metallurgical industry in various steels and nonferrous alloys. The second largest use is by the chemical industry in pigments, metal finishing, leather tanning and wood treatment. Relevant physical properties are compiled below:

MW	log K_{ow}	H	K_d	D_a	D_w	VP	S
52.00[a] (element)	NA	NA	1.8E+6 (CrIII) 1.9E+1 (CrVI)[b]	NA	NA	ND	Note 1[a]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; K_d = soil/water partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; NA = not applicable; ND = no data.
Note 1: Chromium compounds vary from insoluble to highly soluble.
[a]Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Toxicological Profile for Chromium***, U.S. Public Health Service, Atlanta, Georgia, September, on line.
U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

2.0 Environmental Fate and Transport

Chromium is released into the atmosphere from natural gas, oil and coal combustion, and from use by the industries mentioned above (ATSDR, 2000). Other sources include wind transport from road dust, cement producing plants, the wearing down of asbestos brake linings from automobiles, incineration of municipal refuse and sewage sludge, exhaust emission from automotive catalytic converters, and emissions from cooling towers that use chromium compounds as rust inhibitors. Significant quantities of chromium are released to surface water from industrial use. Land disposal of chromium-containing commercial products, solid waste and slag from chromate manufacture, and coal ash, primarily from electric utilities and other operations that burn coal, are the major releases to soil.

Chromium releases from combustion processes and ore processing are generally in the form of chromium (III) oxide; however, chromium (VI) has been identified in fly ash from coal combustion at chromate manufacturing and user sites (ATSDR, 2000). Airborne chromium exists in particulate form that may travel great distances from the point of emissions; wet and dry deposition account for the majority of removal from air.

Most chromium released to surface water eventually adsorbs to particles and becomes deposited in bottom sediment, but small quantities may remain in the water in both soluble and insoluble forms (ATSDR, 2000). The soluble forms are usually chromium (VI) salts and soluble chromium (III) compounds. Chromium (VI) may be found in water, but eventually organic matter and other reducing agents will reduce chromium (VI) to chromium (III). Chromium in soil is present

mainly as insoluble chromium (III) carbonates and oxides that are unlikely to be mobile to any significant extent. However, soluble forms may also be present, depending on the form of the chemical released, that may be quite mobile in soil. Also, lower pH facilitates complexation with organic matter and increases mobility.

Empirical evidence suggests that chromium is unlikely to participate significantly in food chain pathways (ATSDR, 2000; EPA, 1995); therefore, biotransfer factors are not compiled.

3.0 Toxicokinetics

Identification of chromium in urine, serum and tissues of occupationally exposed humans confirms that soluble chromium (III) and chromium (VI) compounds are absorbed from the lung (ATSDR, 2000). The rate of absorption, however, depends largely on the physical and chemical characteristics of the chromium compound involved, as shown in numerous animal inhalation studies. Chromium (VI) compounds are more readily absorbed because the chromate anion participates in facilitated diffusion mechanisms not available to chromium (III).

Absorption of dietary sources of chromium from the GI tract in humans ranges from approximately 0.5 to 2 percent, as inferred from urinary excretion data (ATSDR, 2000). The extent of absorption appears to be inversely related to dietary chromium content. A review of several studies suggests that 0.4 to 14.5 percent of orally administered chromium not related to dietary sources is absorbed by the GI tract of humans, but valence and chemical form and nutritional status (fed vs. fasting) appear to influence efficiency of absorption (ATSDR, 2000). Chromium (VI) sources are more efficiently absorbed than chromium (III) sources as described above for inhalation exposure. Experiments with laboratory animals showed that the stomach has the ability to reduce chromium (VI) to chromium (III), reducing the extent of absorption when chromium (VI) compounds were administered *per os* compared with injection directly into the jejunum.

Both chromium (III) and chromium (VI) can penetrate intact human skin, and dermal uptake is increased if the skin is damaged (ATSDR, 2000). In some cases, dermal uptake was sufficient to result in signs of toxicity. The form and the vehicle greatly influence the rate of dermal uptake.

Inhaled particles of chromium compounds can remain in the lungs for years (ATSDR, 2000). Chromium absorbed into the blood is distributed throughout the body with highest levels frequently located in the kidneys. Chromium has been shown to cross the placenta and to be excreted via lactation. Autopsy studies in the US show that highest concentrations in newborns occur in the kidney, liver, aorta, heart, pancreas and spleen, and that tissue levels decline with age.

The main feature of the metabolism of chromium involves reduction of chromium (VI) to chromium (III) via the formation of chromium (V) and chromium (IV) intermediates (ATSDR, 2000). Reduction of chromium (VI) to chromium (III) occurs in the acid milieu of the stomach, primarily by reaction with ascorbate. Ascorbate, glutathione and other substrates effectively reduce absorbed chromium (VI) to chromium (III). Chromium (III) is considered a nutritionally essential element required for the proper metabolism of glucose, proteins and lipids. It acts as part of a complex known as GTF, which facilitates the action of insulin. Although chromium (III) complexes are generally thought to be inert, there is recent evidence that chromium (III)

may be reduced to chromium (II), which could catalyze the Haber-Weiss reaction resulting in the production of genotoxic hydroxyl radicals.

Absorbed chromium is excreted primarily in the urine (ATSDR, 2000).

4.0 Dermal Exposure

EPA (2004) recommends GAFs of 0.013 for chromium (III) and 0.025 for chromium (VI), generally consistent with the toxicokinetic data reviewed above, which are used in this evaluation. The GAF of 0.013 for chromium (III) should be used for total chromium, which is assumed to consist of 6 parts of chromium (III) to 1 part of chromium (VI) (EPA, 2004b, 2011).

Data were not located regarding the extent of dermal uptake of chromium from soil, and EPA (2004) provides no estimate of the extent of dermal absorption (ABS). EPA (2004) recommends that dermal uptake from soil should not be quantified for chemicals without ABS recommendations, but that these chemicals should be discussed qualitatively as a source of uncertainty. EPA (2004) compiled *in vivo* and *in vitro* data from human experiments of dermal uptake of chromium from water. Average K_p values of 1E-4 cm/hour and 1E-3 cm/hour are estimated for chromium (III) and chromium (VI), respectively. The K_p of 1E-4 cm/hour for chromium (III) should be used for total chromium as explained above.

5.0 Noncancer Effects Evaluation

As mentioned above, chromium (III) is an essential nutrient involved in maintenance of normal metabolism (ATSDR, 2000). EPA (2011) verified an RfD of 1.5E+0 mg/kg-day for chronic oral exposure to chromium (III) by applying an uncertainty factor of 1000 to a NOEL of 1800 g/kg (1.468 mg/kg body weight/day) as an average total ingested dose in a dietary study in which rats were given 600 feedings of chromic oxide baked into bread. No other dose levels were tested. Confidence in the RfD is low. No target organ or critical effect was identified for the toxicity of oral exposure to chromium (III).

The available data do not suggest a significant difference between chronic and subchronic exposure regarding the threshold for the noncancer effects of chromium (III). Therefore, EPA (1997) adopted the verified chronic oral RfD, which at the time was listed on IRIS as 1E+0 mg/kg-day, as the provisional subchronic oral RfD for chromium (III). Subsequently, EPA (2011) recalculated the average daily dose, which led to revising the chronic oral RfD from 1E+0 to 1.5E+0 mg/kg-day. Since the only change between the earlier and the present verified oral RfD reflects a recalculation, it is recommended that the current verified chronic oral RfD of 1.5E+0 mg/kg-day should also be used for subchronic exposure.

EPA (2011) verified an RfD for chronic oral exposure to chromium (VI) of 3E-3 mg/kg-day based on a NOAEL of 25 mg/L (2.5 mg/kg-day) in the drinking water of rats exposed for one year. An overall uncertainty factor of 900 was applied. The uncertainty factor consists of factors of 10 each for inter- and intra-species variation, a factor of 3 to expand from subchronic to chronic exposure, and a modifying factor of 3 to address concerns that relatively low levels may induce GI effects and possibly some forms of cancer in humans. Inclusion of the modifying factor of 3 was a relatively recent (1998) revision to a previously verified derivation. Nonetheless, EPA (2011) notes that confidence in the chronic oral RfD is low.

EPA (1997) presented a provisional subchronic oral RfD of 2E-2 mg/kg-day for chromium (VI) based on the same drinking water study and an uncertainty factor of 200 (not otherwise explained). Presumably, this derivation reflects the earlier IRIS evaluation before inclusion of the modifying factor of 3. However, the concern for GI effects that gave rise to the modifying factor could apply to subchronic as well as chronic exposure. Therefore, it is recommended that a new preliminary subchronic oral RfD should be calculated for chromium (VI). This is done by applying an overall uncertainty factor of 300 to the NOAEL of 2.5 mg/kg-day from the drinking water study. The uncertainty factor of 300 reflects the overall uncertainty factor of 900 used for the chronic RfD without the factor of 3 to expand from subchronic to chronic exposure. The preliminary subchronic oral RfD for chromium (VI) so calculated is 8E-3 mg/kg-day.

The data summarized by EPA (2011) are insufficient to identify a mechanism of toxicity or target organ(s) for chronic oral exposure to chromium (VI). Data from other sources, however, are sufficient to identify potential target organs. Goyer (1991) reported that renal tubular necrosis is the major effect in humans from ingestion of chromium compounds. The context, however, suggests that this effect is associated with acute exposure to high doses (e.g., accidental or attempted suicide ingestion); therefore, the kidney may not be an acceptable candidate as a target organ for chronic oral exposure. Furthermore, a review of human and animal studies by EPA (1998a) did not implicate the kidney as a target organ for chronic oral exposure. EPA (1998a), however, reported GI effects in a cohort of 155 Chinese villagers who consumed water from a well located adjacent to a chromium alloy plant. Symptoms included oral ulcers, diarrhea, abdominal pain, indigestion, and leukocytosis with a left shift. The dose rate of chromium (VI) was estimated at 0.57 mg/kg-day, nearly 200 times the oral RfD. It is likely that the GI symptoms reflect the irritant nature of chromium (VI).

EPA (1998a) also reviewed several reproductive studies. An early and inadequately conducted study reported no effects in rats fed a diet containing 0.125 percent K_2CrO_4. A diet containing 0.25 percent resulted in “subnormal condition” (including rough coat) and “subnormal” offspring; a diet containing 0.5 percent resulted in diarrhea and sterility. Assuming rats consume food equivalent to 5 percent of their body weight each day (EPA, 1980), dietary levels of 0.125, 0.25 and 0.5 percent correspond to chromium (VI) dose rates of 17, 33, and 67 mg/kg-day, respectively. Drinking water studies consistently report developmental effects and impaired reproduction in rats and mice ingesting approximately 20 mg chromium (VI)/kg-day. A well controlled study reported slightly decreased erythrocyte size and hemoglobin content in rats and mice of either sex fed diets containing 400 ppm potassium chromate. The effects were interpreted as “suggestive of a potential bone marrow/erythroid response.” The 400 ppm diet is equivalent to chromium (VI) dose rates of 6.4 mg/kg-day in rats (EPA, 1998a) and approximately 11 mg/kg-day in mice, assuming that mice consume food equivalent to 10 percent of their body weight/day (EPA, 1980). In addition, cytoplasmic vacuolization of hepatocytes was observed in mice fed diets containing 50, 100 or 400 ppm potassium chromate, but it is not clear if either the incidence or intensity occurred in a dose-related manner. The 50 ppm diet, the lowest associated with hepatocellular vacuolization, is equivalent to a chromium (VI) intake rate of approximately 1.3 mg/kg-day. A subsequent study reported decreased erythrocyte hemoglobin content in female mice fed a diet containing 100 ppm potassium chromate, equivalent to a chromium (VI) dose rate of 6.0 mg/kg-day.

The GI signs reported in humans are clearly an indication of adverse effects; therefore, the GI tract is selected as a target organ. The mechanism of toxicity is assumed to be the irritation

induced by tissue contact with chromium (VI). The slight hematologic changes observed in rats and mice and the hepatocellular vacuolization observed in mice do not appear to be sufficiently threatening to be considered adverse. Therefore, target organs selected for chronic oral exposure to chromium (VI) include the GI tract, unborn child (fetus), and reproductive system.

Inhalation (occupational) exposure to chromium may induce respiratory symptoms, changes in lung function and irritation, erosion or perforation of the nasal septum, depending in part on the exposure level (EPA, 2011). No adverse effects were observed in workers exposed to 1E-3 mg/m^3 for 0.2 to 23.6 years (average 2.5 years). EPA (1998b, 2011) reviewed several human and animal studies, and determined that effects observed from inhalation exposure to chromium (VI) are not relevant to exposure to chromium (III). EPA (1998c) concluded that chromium (VI) is the only form of chromium of concern for inhalation exposure.

EPA (2011) developed separate chronic inhalation RfC values for human exposure to chromic acid mists and dissolved chromium (VI) aerosols, and for exposure to chromium (VI) particulates. A verified chronic inhalation RfC of 8E-6 mg/m^3 for chromic acid mists and dissolved chromium (VI) aerosols is based on an adjusted LOAEL of 7.14E-4 mg/m^3 associated with atrophy of the nasal septum in subchronically occupationally exposed humans. An overall uncertainty factor of 90 was used, consisting of factors of 10 for intraspecies variation, 3 to estimate a NOAEL from a LOAEL, and 3 to expand from subchronic to chronic exposure. Confidence in the inhalation RfC is low. The upper respiratory tract is considered the target organ for inhalation exposure to chromic acid mists and dissolved chromium (VI) aerosols. The chronic inhalation RfC is equivalent to a chronic inhalation RfD of 2.3E-6 mg/kg-day.

Inhalation exposure to chromium (VI) particulates is associated with pneumocyte toxicity; i.e., with effects on the lungs themselves. EPA (2011) derived an RfC of 1E-4 mg/m^3 for chronic inhalation exposure to chromium (VI) particulates from an adjusted benchmark concentration of 3.4E-2 mg/m^3 associated with altered enzyme activity in bronchioalveolar lavage fluid from rats exposed to sodium dichromate dust intermittently for up to 90 days. An uncertainty factor of 300 was used, consisting of a factor of 10 to provide additional protection to unusually sensitive individuals, and factors of 3 each to cover for physiologic differences between rats and humans, and to expand from subchronic to chronic exposure. Confidence in the RfC is medium. The RfC is equivalent to a chronic inhalation RfD of 2.9E-5 mg/kg-day. The lung is considered to be the target organ for chronic inhalation exposure to chromium (VI) particulates.

No current EPA-derived subchronic inhalation evaluation exists for chromic acid mists and dissolved chromium (VI) aerosols. However, a preliminary subchronic inhalation RfC can be derived by excluding the uncertainty factor of 3 for expanding from subchronic to chronic exposure. Application of the remaining overall uncertainty factor of 30 to the adjusted LOAEL of 7.14E-4 mg/m^3 yields a preliminary subchronic inhalation RfC of 2E-5 mg/m^3 for chromic acid mists and dissolved chromium (VI) aerosols. The preliminary subchronic inhalation RfC is equivalent to a subchronic inhalation RfD of 6.8E-6 mg/kg-day.

No current EPA-derived subchronic inhalation evaluation exists for chromium (VI) particulates. However, a preliminary subchronic inhalation RfC can be derived by excluding the uncertainty factor of 3 for expanding from subchronic to chronic exposure. Application of the remaining overall uncertainty factor of 100 to the adjusted LOAEL benchmark concentration of 3.4E-2 mg/m^3 yields a preliminary subchronic inhalation RfC of 3E-4 mg/m^3 for chromium (VI)

particulates. The preliminary subchronic inhalation RfC is equivalent to a subchronic inhalation RfD of 9.7E-5 mg/kg-day.

EPA (1998c) noted that exposure to chromic acid mists and dissolved chromium (VI) aerosols is likely to be restricted to occupational settings and that most environmental exposures would involve exposure to chromium (VI) particulates. Therefore, the chronic inhalation RfC and RfD for chromium particulates will be used in this evaluation.

6.0 Carcinogenicity Evaluation

EPA (2011) classified chromium (III) in cancer weight-of-evidence group D – not classified as to carcinogenicity to humans – because of inadequate data. Chromium (VI) is classified in cancer weight-of-evidence group A – known human carcinogen – based on the consistent finding of lung cancer in epidemiologic studies of occupationally exposed workers in chromate production and the chrome pigment industry (EPA, 2011). Conclusions regarding the human data are corroborated by data from animal experiments. There is no evidence that oral exposure to chromium (VI) induces cancer, and EPA (2011) assigned chromium (VI) to Group D for oral exposure.

An inhalation URF of 1.2E-2 per ug/m^3, equivalent to an inhalation SF of 4.2E+1 per mg/kg-day, was based on increased risk of lung cancer deaths in chromate production workers (EPA, 2011). It should be noted that the quantitative assessment is based on the concentration of total chromium to which the workers were exposed, including insoluble (trivalent) and soluble (hexavalent) forms. It was assumed that chromium (VI) constituted not less than one-seventh of the total chromium; i.e., a ratio of 1 part of chromium (VI) to 6 parts of chromium (III). However, the forms of chromium in the air were not identified, and chromium (VI) may have constituted a significantly much greater portion of total airborne chromium. EPA (200) presented the URF of 1.2E-2 per ug/m^3 as a verified potency estimate for chromium (VI), but noted that this estimate may underestimate the potency of exposure to pure chromium (VI) by as much as seven-fold.

7.0 Toxicity Summary

Toxicity values for chromium (III) and chromium (VI) are summarized below. Theoretical noncancer toxicity values are calculated for total chromium assuming a chromium (III)/chromium (VI) ratio of 6 to 1. Note that the URF is based on a mixture of chromium (III) and chromium (VI).

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
Chromium (III)										
1.5E+0	1.5E+0	ND	ND	ND	NA	D	ND	D	ND	ND
Chromium (VI)[b]										
8E-3	3E-3	GI, F, Re	3E-4/ 9.7E-5	1E-4/ 2.9E-5	Lu	D	ND	A	1.2E-2	4.2E+1
Total Chromium[c]										
NA	2.1E-2	GI, F, Re	NA	7E-4/ 2.0E-4	Lu	D	ND	A	1.2E-2	4.2E+1
sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference										

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi

concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: GI = gastrointestinal tract, F = unborn child (fetus), Re = reproductive system, Lu = lung.
[a]sRfDo and cRfDo should be adjusted by the appropriate GAF values described above when used for dermal exposure.
[b]Inhalation RfC/RfD values listed are those for chromium (VI) particulates. Values for chromic acid mists and dissolved chromium (VI) aerosols are not relevant to environmental exposures.
[c]For noncancer effects is based on the assumption that total chromium consists of 1 part of chromium (VI) and 6 parts of chromium (III); note that the URF assumed a mixture of chromium (III) to chromium (VI) at a ratio of approximately 6:1 (EPA 2011; EPA, 2004b).

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Chromium***, U.S. Public Health Service, Atlanta, Georgia, September, on line.

Goyer, R.A., 1991, "Toxic Effects of Metals," in ***Casarett and Doull's Toxicology The Basic Science of Poisons***, Fourth Edition, M.O Amdur, J. Doull and C.D. Klaassen, eds., Pergamon Press, New York, pp. 623-680.

U.S. Environmental Protection Agency (EPA), 1980, "Appendix C – Guidelines and Methodology Used in the Preparation of Health Effect Assessment Chapters of the Consent Decree Water Criteria Documents," ***Federal Register***, 45(231): 79347-79357.

U.S. Environmental Protection Agency (EPA), 1995, "40 CFR 9, 122, 123, 131, and 132 Final Water Quality Guidance for the Great Lakes System; Final Rule," ***Federal Register***, 60(56); 15366-15425.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 1998a, ***Toxicological Review of Hexavalent Chromium (CAS No. 18540-29-9) In Support of Summary Information on the Integrated Risk Information System (IRIS)***, August, on line.

U.S. Environmental Protection Agency (EPA), 1998b, ***Combustion Technical Assistance Center (CTAC) Request No. 70: Chromium Values***, National Center for Environmental Assessment, Cincinnati, Ohio, 22 September.

U.S. Environmental Protection Agency (EPA), 1998c, ***Combustion Technical Assistance Center (CTAC) Request No. 77: Information Regarding Chromium (III) and (VI) for Site-Specific Risk Assessment***, National Center for Environmental Assessment, Cincinnati, Ohio, 5 October.

U.S. Environmental Protection Agency (EPA), 2003, Telephone conversation between Ted Simon, EPA Region IV, and P. Goetchius, Shaw E & I, 10 October.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

COBALT (7440-48-4)

1.0 Introduction and Physical Properties

Cobalt is a relatively scarce **metal**, constituting about 0.001 percent of the earth's crust (Elinder and Friberg, 1986). It often occurs in association with nickel, silver, lead, copper and iron ores. Cobalt is used in forming special metal alloys with unusual and useful properties (ATSDR, 2004; HSDB, 2011). It is also used in cutting materials, lacquers, varnishes, paint driers, enamels, inks, glazes, glass manufacture, as a catalyst in petroleum refining, and as a supplement in animal and human nutrition. Relevant physical properties are compiled below:

MW	log K_{ow}	H	K_d	D_a	D_w	VP	S
58.93[a]	NA	NA	45[b]	NA	NA	ND	Note 1[c]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; K_d = soil/water partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; NA = not applicable; ND = no data.
Note 1: Cobaltous chloride as a typical cobalt salt: soluble.
[a]Hazardous Substance Data Bank (HSDB), 2004, National Library of Medicine, on line.
[b]Baes, C.F., R.D. Sharp, H. Sjoreen, and R.W. Shor, ***A Review and Analysis for Assessing Transport of Environmentally Released Radionuclides through Agriculture, ORNL-5786, Oak Ridge National Laboratory*** .
[c]Budavari, S, Ed., 1989, ***The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals***, Eleventh Edition, Merck & Co., Rahway, NJ.

2.0 Environmental Fate and Transport

Cobalt is released to the environment, particularly to the air, largely from industrial processes that involve grinding or polishing hard metal devices that contain cobalt (HSDB, 2011). Other anthropogenic sources include fossil fuel burning, vehicular and aircraft exhaust, production and use of cobalt-containing alloys and chemicals, copper and nickel smelting and refining, disposal of sewage sludge, and application of fertilizers derived from phosphate rock (ATSDR, 2004). Natural sources include soil and soil dust, seawater spray, and volcanic eruptions. Natural releases to the atmosphere slightly exceed anthropogenic releases.

Ionic cobalt compounds exist in the particulate phase in air and these compounds may be removed from the air by wet and dry deposition (HSDB, 2011).

HSDB (2011) reports that K_d values for cobalt range from 0.2 to 3,800 L/kg. The value of 45 L/kg presented above appears to be a reasonable intermediate point. Soils with higher pH and content of clay, natural organics, and hydrous manganese and iron oxides, bind cobalt to a greater degree; as these factors decrease, the mobility of cobalt increases. Microbial activity may increase the solubility of cobalt in soil. Chelating agents increase the solubility of cobalt and enhance its mobility in soil. Cobalt compounds do not volatilize from moist or dry soil surfaces due to their ionic character.

The transport and speciation of cobalt in natural waters and sediments is complicated by many factors (HSDB, 2011). The presence of sewage-derived organics appears to enhance the solubility of cobalt in freshwater by forming soluble complexes. Cobalt exists in the +2 or +3

oxidation state for the majority of its compounds and complexes. Volatilization from water surfaces is not expected, due to the ionic nature of dissolved cobalt compounds.

A few plant species are known to accumulate cobalt; however, translocation to aerial parts is generally insignificant (ATSDR, 2004; HSDB, 2011). Cobalt is bioaccumulated by aquatic organisms, particularly at the lower trophic levels. Biomagnification, however, does not occur and cobalt localizes in the viscera and on the skin, rather than in edible tissues. Therefore, cobalt is not expected to impact human health through the food-chain pathways and biotransfer factors are not provided.

3.0 Toxicokinetics

Inhaled cobalt particles deposit in the upper or lower respiratory tract, depending largely on particulate size (ATSDR, 2004). Uptake may occur by dissolution or phagocytosis; larger particles are removed by ciliary clearance. The extent of pulmonary uptake depends largely on particle size distribution.

GI absorption of ingested cobalt in humans ranges from 18 to 97 percent, depending on the form and dose, and on the nutritional status of the subjects (ATSDR, 2004). Cobalt is absorbed more efficiently in cases of iron deficiency. Animal studies show that soluble forms such as cobalt chloride are absorbed to a much greater extent (13 to 34 percent) than insoluble cobalt oxide (1 to 3 percent).

Experiments with humans indicate that cobalt in hard metal dust can be absorbed through the skin, although the rate or extent of uptake were not quantified (ATSDR, 2004). Experiments in animals indicate that cobalt is absorbed much more efficiently through abraded than intact skin.

Distribution of cobalt within body tissues depends in large measure on the route of exposure (ATSDR, 2004). Cobalt as a component of cyanocobalamin (vitamin B12) is generally distributed among the body tissues. Highest levels following inhalation exposure are found in the tissues and lymph nodes of the respiratory tract. Lesser but elevated levels are found in liver, spleen and kidney. Highest levels are found in the liver following ingestion exposure.

Elimination also depends on route of exposure (ATSDR, 2004). Inhaled particulates are cleared by mucociliary elevation, phagocytosis and dissolution. Elevated particles are swallowed and subjected to GI absorption or throughput in the feces. Absorbed cobalt is excreted primarily through the urine.

4.0 Dermal Exposure

The provisional chronic oral RfD of 3E-4 for cobalt was derived from a study in which humans were treated orally with cobalt (EPA, 2008). A GAF of 1, as recommended by EPA (2004) is selected for cobalt.

Data were not located regarding the extent of dermal uptake of cobalt from soil, and EPA (2004) provides no estimate of the extent of dermal absorption (ABS). EPA (2004) recommends that dermal uptake from soil should not be quantified for chemicals without ABS recommendations, but that these chemicals should be discussed qualitatively as a source of uncertainty. The EPA (2004) K_p for cobalt of 4E-4 cm/hour is selected for cobalt.

5.0 Noncancer Effects Evaluation

Human health effects following oral exposure to cobalt include decreased iodine uptake by the thyroid, dermatitis in sensitized individuals, increased erythrocyte production and hemoglobin levels, and cardiomyopthy. Related effects to each of these, except dermatitis, are supported by animal studies. Other effects observed in animal studies include neurobehavioral and testicular; these effects were observed only at relatively high doses. Thyroid toxicity was selected as the critical effect for the derivation of provisional oral reference doses.

Cobalt is nutritionally essential as a cofactor in cyanocobalamin ATSDR, 2004). The element is ubiquitous and universally present in the diet. Data from a dietary survey performed in the 1980s indicate that daily U.S. dietary intakes of cobalt are in the range of 3E-3 to 1.1E-2 mg/day (4E-5 to 2E-4 mg/kg-day, assuming an average body weight of 70 kg). Chronic ingestion from the consumption of beer containing high concentrations of cobalt is associated with "beer-cobalt cardiomyopathy," which includes polycythemia and goiter, as well as marked myocardial degeneration and mortality. However, confounding variables were identified and a dose-response could not be derived from the associated studies (EPA, 2008).

A consistently produced effect of exogenously administered cobalt in humans is the erythropoietic effect of stimulating erythrocyte production resulting in increased blood hemoglobin concentration (EPA, 2002). Cobalt chloride has been used therapeutically at dose rates of 1.6E-1 to 3.2E-1 mg cobalt/kg-day in anemic, anephric dialysis patients for 12 to 32 weeks to induce a significant, but reversible, rise in blood hemoglobin concentration. Clinical studies demonstrating this effect identified an effect level of 1.8E-1 mg/kg-day, which EPA (2002) had previously designated a LOAEL. However, EPA (2008) has since identified confounding variables, and has judged the effects of cobalt in some of the patients in pertinent studies as beneficial rather than adverse.

A LOAEL of 1 mg/kg-day for subchronic thyroid toxicity as the critical oral effect was identified by EPA (2008) from a subchronic study by Roche and Layrisse (1956). A provisional subchronic RfD of 3E-3 mg/kg-day was derived assuming a composite UF of 300. This assumes a UF of 10 for LOAEL to NOAEL conversion, and a UF of 10 for inter-individual variability. An additional UF of 3 was added due to a lack of multigenerational studies, since testicular degeneration and sperm function were noted in some animal studies.

The provisional chronic oral RfD of 3E-4 mg/kg-day was derived as described for the subchronic RfD, with an additional UF of 10 added to extrapolate from subchronic to chronic exposure for a composite UF of 3,000 (EPA, 2008). Confidence in the principal study is described as low-to-medium.

The human and animal database indicate that symptoms of inhaled cobalt include respiratory tract irritation and altered pulmonary function. There were identified as the critical effects for exposure to inhaled cobalt for the derivation of RfDs. A NOAEL adjusted for continuous exposure of 1.9 $\mu g/m^3$ was identified by EPA (2008). A subchronic RfC of 2E-5 mg/m^3 was derived by EPA (2008) assuming a composite UF of 100, assuming a UF of 10 for database insufficiencies and a UF of 10 for inter-individual variability. The preliminary subchronic inhalation RfC is equivalent to a preliminary subchronic inhalation RfD of 5.7E-5 mg/kg-day.

A provisional chronic RfC of 6E-6 mg/m3 was derived as described above for the subchronic RfC, but with an additional UF of 3 for the extrapolation from subchronic to chronic exposure (EPA, 2008). Thus, the composite UF is 300. This provisional RfC equals an inhalation RfD of 1.7E-6 mg/kg-day.

6.0 Carcinogenicity Evaluation

Human or animal studies examining the carcinogenicity of cobalt associated with oral exposure were not located. Therefore, cobalt is classified as having "inadequate information to assess carcinogenic potential" via the oral pathway, thus no cancer slope factor was derived (EPA, 2008).

Cobalt is described as "likely to be carcinogenic to humans by the inhalation route," based on limited evidence of carcinogenicity in humans (occupational studies) and sufficient evidence of carcinogenicity in animals (EPA, 2008). Respiratory tract tumors have been suggested in occupational studies as the result of inhaled cobalt. Statistically increased incidence of respiratory tract tumors have been observed in animal studies. Limited evidence supports genotoxicity and cytotoxicity, followed by cellular regeneration as potential modes of cobalt tumorigenicity. A mutagenic effect may be plausible for inhaled cobalt, but has not been clearly established (EPA, 2008).

Human inhalation studies were not sufficiently detailed to use in the derivation of a URF. Rats and mice exposed via inhalation to cobalt sulfate heptahydrate for 2 years developed alveolar and bronchial lung tumors (neoplasms and adenomas). EPA (2008) identified a benchmark dose level of In the absence of an identified mode of action, EPA developed a provisional URF by linear extrapolation of benchmark dose level of 0.011 mg/m^3. Using a benchmark response of 10 percent in extra risk, a provisional URF of 9E-3$(\mu g/m^3)^{-1}$ was derived for cobalt sulfate. This equals an inhalation SF of 3.2E+1 $(mg/kg\text{-}day)^{-1}$.

7.0 Toxicity Summary

Toxicity values for cobalt are summarized as follows:

Noncancer Effects						Carcinogenicity				
Oral Exposure			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
3E-3	3E-4	Thyroid	2E-5/5.7E-5	6E-6/ 1.7E-6	RT	ND	ND	B	9E-3	3.2E+1

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: RT = respiratory tract.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 2004, ***Toxicological Profile for Cobalt***, Draft for Public Comment, U.S. Department of Health and Human Services, Atlanta, Georgia, April.

Elinder, C.-G and L. Friberg, 1986, "Cobalt," In: Friberg, L., G.F. Nordberg and V.B. Vouk, Eds., ***Handbook on the Toxicology of Metals,*** Second Edition, Volume II: Specific Metals, Elsevier Science Publishers, New York, NY, pp. 211-232.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

Roche, M., and M. Layrisse, 1956, "The Effect of Cobalt on Thyroidal Uptake of I^{131}", ***Journal of Clinical Endocrinology and Metabolism***, Volume 16, pp. 831-833.

U.S. Environmental Protection Agency (EPA), 2002, ***Risk Assessment Issue Paper for: Derivation of a Provisional RfD for Cobalt and Compounds (CASRN 7440-48-4)***, National Center for Environmental Assessment, Cincinnati, Ohio, 15 January.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2008, ***Provisional Peer-Reviewed Toxicity Values for Cobalt (CASRN 7440-48-4)***, National Center for Environmental Assessment, Cincinnati, Ohio, 25 August.

IRON (7439-89-6)

1.0 Introduction and Physical Properties

Iron is a very abundant, ubiquitous, naturally occurring **metal** that constitutes approximately 5 percent of the earth's crust (Spivey Fox and Rader, 1988). It is the second most prevalent metal in the earth's crust following aluminum (HSDB, 2011). Its primary use is in making steels and other metals that have a wide range of application. Less than one percent of iron is used to make iron compounds that have application in dyes and pigments, water treatment, organic chemical synthesis, and medicinal preparations. Relevant physical properties are compiled below:

MW	log K_{ow}	H	K_d	D_a	D_w	VP	S
55.85[a] (Element)	NA	NA	25[b]	NA	NA	ND	Note 1[a]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; K_d = soil/water partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; NA = not applicable; ND = no data.
Note 1: Ferrous sulfate as a typical iron salt: soluble.
[a]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.
[b] Baes, C.F., R.D. Sharp, H. Sjoreen, and R.W. Shor, ***A Review and Analysis for Assessing Transport of Environmentally Released Radionuclides through Agriculture, ORNL-5786, Oak Ridge National Laboratory*** .

2.0 Environmental Fate and Transport

There is little information available regarding the anthropogenic release of iron and its fate in the environmental, probably because of its prevalence in nature. Clearly, however, mining and handling of iron ores releases dust containing iron oxides (HSDB, 2011). Presumably the manufacture and use of iron compounds may result in release to the environment, but data were not located.

Insoluble iron compounds are most likely to occur in air as particulates, and are expected to deposit to soil and surface water (HSDB, 2011). Although data are unavailable, soluble compounds are expected to leach to groundwater, and to remain in solution in both groundwater and surface water. The extent of partitioning to sediment is expected to depend on water pH, organic matter and reduction-oxidation potential of the water system.

Biouptake of iron is known to occur, because the element is a nutritionally required trace element that is a structural component of heme proteins and some enzymes, which are common to mammals and several other orders of living organisms (Spivey Fox and Rader, 1988). However, there is no evidence that iron bioconcentrates in either aquatic or terrestrial food chain pathways. Therefore, biotransfer factors for iron are not presented.

3.0 Toxicokinetics

The GI absorption of iron is regulated by homeostatic mechanisms sited largely in the intestinal mucosa (Goyer, 1991; EPA, 2006). Approximately 2 to 15 percent of dietary iron is ordinarily absorbed; however, several dietary factors may increase or decrease absorption (HSDB, 2011). Dietary iron from animal sources is absorbed more readily (10 to 25 percent) than iron from

vegetables and grains (1 to 10 percent) (Elinder, 1986). Absorption is greatly increased at times of unusual need (rapid growth of childhood, pregnancy, blood loss). Divalent (ferrous) iron is absorbed into the intestinal mucosal cells and released to the blood plasma where it is oxidized to the trivalent (ferric) form, which binds with a specific protein, transferrin, for transport to storage sites.

Approximately 67 percent of iron in the body is associated with hemoglobin in the erythrocytes, 10 percent is associated with myoglobin and various iron-containing enzymes, and the remainder is bound to ferritin or hemosiderin, which are intracellular storage forms (Goyer, 1991). Ferritin and hemosiderin bind iron in a manner that renders it inactive for beneficial use (e.g., hemoglobin synthesis) and inactive as a toxicant. Some of the iron taken up by the cells of the reticuloendothelial system remains stored and some enters a labile pool that is available for erythropoiesis.

Excess iron is generally excreted, in part in shed intestinal epithelial cells, or in the bile or urine (Goyer, 1991). In cases of very high iron intake, excretion may be unable to remove iron as quickly as it is absorbed. Iron overload results, which stimulates increased synthesis of ferritin and increased iron storage, particularly in the liver, pancreas, spleen, various endocrine organs and the heart.

4.0 Dermal Exposure

As noted above, the GI absorption of iron appears to be under homeostatic control in normal humans (EPA, 2006), which suggests that GI absorption could vary widely between individuals depending on nutritional status. Given the uncertainty about the GI absorption of iron, a default GAF of 1 (EPA, 2004) is chosen for this evaluation.

Data were not located regarding the extent of dermal uptake of iron from soil, and EPA (2004) provides no estimate of the extent of dermal absorption (ABS). EPA (2004) recommends that dermal uptake from soil should not be quantified for chemicals without ABS recommendations, but that these chemicals should be discussed qualitatively as a source of uncertainty. Empirical data regarding the uptake of soluble forms of iron from water were not located. The EPA (2004) default K_p for inorganic chemicals of 1E-3 cm/hour is selected for iron.

5.0 Noncancer Effects Evaluation

Iron is a nutritionally required trace element that forms an integral part of hemoglobin, myoglobin and several enzymes (Spivey Fox and Rader, 1988). The NAS (1989) Recommended Daily Allowance (RDA) for iron is 10 mg/day (0.13 mg/kg-day) for adult males; 15 mg/day (0.24 to 0.33 mg/kg-day) for females aged 11 to 50 years; 30 mg/day (0.443 mg/kg-day) for pregnant females; and 10 mg/day (0.36 to 1.11 mg/kg-day) for children aged 6 months to 10 years.

Both acute and chronic toxicity syndromes are associated with ingestion exposure to iron. Acute toxicity generally involves children (Goyer, 1991). Acute ingestion of large quantities (e.g., children may ingest several ferrous sulfate tablets with candy-like coating) results in severe GI irritation and, in some cases, liver damage. Liver cirrhosis and blood coagulation defects (indicative of reduced circulating levels of blood clotting factors produced by the liver) are observed as sequellae to severe acute toxicity.

Three chronic toxicity syndromes that result in iron overload have been observed in humans (Goyer et al., 1991). The first chronic syndrome is idiopathic hemochromotosis, which arises from a genetic derangement of the homeostatic mechanisms that control iron absorption. This syndrome involves greatly increased GI absorption of iron, regardless of the level of iron in the diet, which results in massive iron overload.

The second chronic syndrome is iron overload resulting from high dietary intake (Goyer, 1991). Although high dietary intake seldom results in iron overload in humans with normal homeostatic control of iron absorption, rare exceptions occur (EPA, 2006). One such exception is the occurrence of iron overload in Bantus who regularly consumed Kaffir beer, an acid beer brewed in iron vessels. This syndrome is not entirely understood; however, the iron in Kaffir beer appears to have exceptionally high bioavailability – equivalent to that of nutritional iron supplements especially formulated for bioavailability – which may account for the increased absorption and iron overload. Other exceptions include persons who take large amounts of tonics or nutritional supplements containing iron.

The third chronic syndrome involves persons requiring multiple blood transfusions over a period of time (Goyer, 1991). This results in the parenteral administration of large quantities of iron that are released as the transfused erythrocytes expire and are removed from the circulation by the reticuloendothelial system. As noted above, excretion cannot keep up with unusually high circulating levels of iron, such as results from multiple blood transfusions. Clearly, the third syndrome has no relevance to environmental exposure.

Regardless of the chronic syndrome that produces it, the effects of iron overload involve the same pathogenesis (Goyer, 1991). Iron stores in the body increase from the normal level of 3 to 5 g, to levels of 20 to 40 g. The cells are induced to increase production of ferritin, which binds the iron cation inactivating its toxicity. Increasingly larger proportions of iron are located in hemosiderin than in ferritin. Hemosiderin is a larger storage protein, probably formed primarily from ferritin. The iron in hemosiderin is essentially completely unavailable and nontoxic. Hemosiderosis is the term given to large accumulations of hemosiderin that do not result in adverse effects because the iron is unavailable. Extremely large accumulations of hemosiderin that result in impaired cellular function is termed hemochromotosis. Hemochromotosis of the liver, endocrine glands and heart is associated with reduced liver function, eventually liver cirrhosis, pancreatic fibrosis, diabetes mellitus, other endocrine disruption and cardiovascular effects.

Goyer (1991) and EPA (2006) reviewed the available data regarding the toxicity of iron. Neither source located any data clearly associating *environmental* exposure with toxicity. EPA (1996) reviewed a study associating high circulating ferritin levels and high dietary iron intakes with myocardial infarction in Finnish men, but association with other factors (e.g., high levels of red meat consumption) confounds interpretation of this study. Furthermore, attempts to produce an animal model of chronic iron toxicity have failed, presumably because of the efficacy of the homeostatic mechanisms that regulate iron absorption from the GI tract.

EPA (1996) reasoned previously that a NOEL for chronic iron overload could be inferred from the estimates of dietary intake and iron status (circulating ferritin levels) established by the second National Health and Nutrition Examination Survey (NHANES II) data base. The

NHANES II study determined that average dietary iron intakes, which ranged from 0.15 to 0.27 mg/kg-day, were associated with normal iron status. More recently, EPA (2006) has concluded that the assignment of a LOAEL based on iron overload for normal individuals cannot be determined based on existing data because of confounding factors in the studies.

EPA (2006) has determined that gastrointestinal toxicity, commonly associated with therapeutic use of iron supplements, is the critical effect. A provisional subchronic and chronic oral RfD of 0.7 mg/kg-day was derived, based on a LOAEL of 1 mg/kg-day and a UF of 1.5 (EPA, 2006). The same value was derived for both subchronic and chronic exposures because clinical experience with iron supplements indicates that the gastrointestinal irritation is associated with treatment and does not intensify with duration. Further, the effect is reversible once treatment is discontinued. A higher UF was not selected because of the reversibility and the effect is not regarded as serious (EPA, 2006).

Inhalation (occupational) exposure to iron oxide fumes may lead to radiographic densities in the lungs without demonstrable clinical effects (ACGIH, 1991). Inhalation of dusts or mists of ferric salts may irritate the respiratory tract. Inhalation data are insufficient for derivation of an inhalation RfC or RfD (EPA, 2005a).

6.0 Carcinogenicity Evaluation

Data regarding the potential carcinogenicity of iron were not located. Neither a cancer weight-of-evidence classification nor cancer potency factors are available (EPA, 2005b).

7.0 Toxicity Summary

Toxicity values for iron are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
7E-1	7E-1	GI	ND	ND	NA	ND	ND	ND	ND	ND

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: GI = gastrointestinal.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.

In most cases, it is inappropriate to apply the toxicity values summarized above to environmental exposure.

8.0 References

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, ACGIH, Cincinnati, Ohio, pp. 803-809.

Elinder, C.-G., 1986, "Iron," in Friberg, L., G.F. Nordberg and V.B. Vouk, eds., ***Handbook on the Toxicology of Metals,*** Second Edition, Volume II: Specific Metals, Elsevier Science Publishers, New York, New York, pp. 276-297.

Goyer, R.A., 1991, "Toxic Effects of Metals," in ***Casarett and Doull's Toxicology, The Basic Science of Poisons, Fourth Edition***, M.O. Amdur, J. Doull and C.D. Klaassen, eds., Pergamon Press, New York, pp 623-680.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

National Academy of Sciences (NAS), 1989, ***Recommended Daily Allowances, 10th Edition***, National Academy Press, Washington, D.C., (Cited in EPA, 1996).

Spivey Fox, M.R. and J.I. Rader, 1988, "Iron," in Seiler, H.G. and H. Sigel, eds., ***Handbook on Toxicity of Inorganic Compounds***, Marcel Dekker, Inc., New York, pp. 345-354.

U.S. Environmental Protection Agency (EPA), 1996, ***Risk Assessment Issue Paper for: Derivation of a Provisional RfD for Iron (CASRN 7439-89-6)***, National Center for Environmental Assessment, Cincinnati, Ohio, 23 July. 2008.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2005a, ***Provisional Peer-Reviewed Toxicity Values for Iron and Compounds (CASRN 7439-89-6), Derivation of a Carcinogenicity Assessment***, National Center for Environmental Assessment, Cincinnati, Ohio, 29 July.

U.S. Environmental Protection Agency (EPA), 2005b, ***Provisional Peer-Reviewed Toxicity Values for Iron and Compounds (CASRN 7439-89-6), Derivation of n Inhalation RfC***, National Center for Environmental Assessment, Cincinnati, Ohio, 16 June.

U.S. Environmental Protection Agency (EPA), 2006, ***Provisional Peer-Reviewed Toxicity Values for Iron and Compounds (CASRN 7439-89-6), Derivation of Chronic and Subchronic Oral RfDs***, National Center for Environmental Assessment, Cincinnati, Ohio, 29 July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

INORGANIC MANGANESE (7439-96-5)

1.0 Introduction and Physical Properties

Manganese is a naturally occurring **metal** found in the earth's crust in the form of numerous minerals such as pyrolusite, romanechite, manganite and hausmannite (ATSDR, 2000; HSDB, 2011; Keen and Leach, 1988). It occurs ubiquitously in the environment, constituting approximately 0.085 percent of the earth's crust, commonly in valence states of +2, +4 and +7; valences of +1, +3, +5 and +6 are rare. Manganese is used in the manufacture of steel, and in other metallurgical processes, batteries, and various manganese-containing chemicals including matches, glass and porcelain, fireworks, varnishes, ceramics, diagnostic contrast media and fungicides. Relevant physical properties are compiled below:

MW	log K_{ow}	H	K_d	D_a	D_w	VP	S
54.938[a] (Elemental)	NA	NA	65[b]	NA	NA	NA	Note 1[c]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; K_d = soil/water partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; NA = not applicable.
Note 1: Metallic manganese decomposes in the presence of water. Manganous chloride as a typical manganese salt: 7.23E+5 mg/L (25˚ C).
[a]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.
[b]Baes, C.F., R.D. Sharp, A.L. Sjoreen, R.W. Shor, 1984, ***A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture***, Health and Safety Division, Oak Ridge National Laboratory, ORNL-5786, September.
[c]Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Manganese***, U.S. Public Health Service, Atlanta, Georgia, September, on line.

2.0 Environmental Fate and Transport

Inorganic manganese compounds enter the atmosphere and other environmental compartments from the weathering of rocks and windblown soil (HSDB, 2011). Anthropogenic sources of atmospheric manganese include metal processing, disposal and use of manganese-containing materials (antiseptics, catalysts, dietary supplements, dry cells, feed additives, fertilizers, pesticides and pigments), resuspension of manganese-containing soil dust, and fly ash emissions from incinerators (ATSDR, 2000; HSDB, 2011). Another source of atmospheric manganese is the combustion of gasoline containing organic manganese anti-knock ingredients such as methylcyclopentadienyl manganese tricarbonyl (MMT). It is unclear whether manganese from this source remains as an organic form or is converted to an inorganic form. The use of MMT in gasoline has been discontinued because of deleterious effects on catalytic converters. Manganese may be released to water by discharge from industrial facilities or in leachate from landfills and soil. Landfill disposal of manganese-containing wastes is the predominant source of manganese release to soil.

Manganese exists in the air bound to particles; dry deposition is the primary removal mechanism, although wet deposition may also be significant (ATSDR, 2000). Manganese in fly ash exists as chlorides and oxides that are relatively soluble and mobile in the environment.

Manganese in water exists as any of several sparingly soluble salts that attach to suspended sediment (ATSDR, 2000). Sedimentation is the primary removal process. Soluble forms also exist, depending on pH of the water, and may be released from sediment. The extent of

absorption to constituents of soil is highly variable. Low concentrations may irreversibly bind to clay, but higher concentrations often manifest considerable mobility.

Manganese may accumulate in various kinds of plants such as legumes, nuts, heather, and tea, and in the lower aquatic trophic levels, but not significantly in the higher aquatic trophic levels or most terrestrial animals (ATSDR, 2000; HSDB, 2011). This indicates that food-chain pathways are unlikely to be significant for human health; therefore, biotransfer factors are not compiled or estimated.

3.0 Toxicokinetics

Manganese is nutritionally essential for humans (ATSDR, 2000). Stable tissue levels are maintained by homeostatic regulation of GI absorption and biliary excretion.

Manganese is absorbed by the respiratory tract (ATSDR, 2000), although data quantifying the extent of absorption were not located. Smaller particles are probably retained in the lung eventually to be absorbed; larger particles are probably removed by mucocilliary elevation and swallowed so that they become available for GI absorption. The more soluble compounds are more readily absorbed by the respiratory tract. Studies in rats given radiolabeled manganese by intranasal administration suggest that olfactory uptake and direct transmission to the brain may occur.

GI absorption of manganese in humans averages 3 to 5 percent, but homeostatic mechanisms reduce the extent of absorption at higher doses (ATSDR, 2000). The more soluble compounds are more readily absorbed. Iron deficiency enhances manganese uptake. Absorption appears to be more efficient and resulting tissue levels appear to be higher in infants than adults.

Quantitative data regarding dermal uptake of manganese were not located.

Normal tissue levels of manganese in humans range from 0.1 to 1 mg/kg wet weight with highest levels in liver, pancreas and kidney, and lowest levels in bone and fat (ATSDR, 2000). Animal studies (inhalation, intranasal, intratracheal and oral administration) confirm that many tissues including the brain, and in some instances specific regions of the brain, show significant increases in manganese levels after treatment. Tissue levels recede toward normal after treatment ceases.

Metabolism of manganese appears to be limited to oxidation-reduction changes in valence state (ATSDR, 2000). The evidence suggests that manganese (+2) is oxidized to manganese (+3), which alters its tissue distribution and slows excretion. Manganese is removed from the blood in the liver and is excreted principally through the bile. Urine, sweat and milk represent minor excretory routes. Animal studies show that the young are less efficient than adults in excreting manganese, although the young do not appear to be more sensitive to its effects.

4.0 Dermal Exposure

Data were not located regarding the extent of dermal uptake of manganese from soil, and EPA (2004) provides no estimate of the extent of dermal absorption (ABS). EPA (2004) recommends that dermal uptake from soil should not be quantified for chemicals without ABS recommendations, but that these chemicals should be discussed qualitatively as a source of

uncertainty. Empirical data regarding the uptake of soluble forms of manganese from water were not located. ATSDR (2000), however, notes that the uptake of manganese across intact skin is "extremely limited," suggesting that uptake of toxicologically significant amounts is unlikely. EPA (2004) provides no chemical-specific estimate of K_p for manganese; therefore, the default K_p value of 1E-3 cm/hr is used to estimate dermal uptake of manganese from water.

5.0 Noncancer Effects Evaluation

Manganese is nutritionally required by humans for normal growth and health (EPA, 2011). Humans exposed to approximately 0.8 mg manganese/kg-day in drinking water (28 mg/L) exhibited lethargy, increased muscle tonus, tremor and mental disturbances. The elderly appeared to be more sensitive than children. Oral treatment of laboratory rodents induces biochemical changes in the brain, but rodents do not exhibit the neurological signs exhibited by humans.

EPA (2011) verified a chronic oral RfD for manganese of 1.4E-1 mg/kg-day from a NOAEL of 1.4E-1 mg/kg-day for neurologic effects from human dietary studies and an uncertainty factor of 1. Confidence in the RfD is medium. The oral RfD of 1.4E-1 mg/kg-day will be used for dietary items other than drinking water. EPA (2011) recommends that the contribution of background diet should be subtracted and that a modifying factor of 3 should be used to adjust for use when oral exposure involves drinking water and non-dietary ingestion. The oral RfD resulting from these manipulations is 2.4E-2 mg/kg-day, which will be used for drinking water and incidental ingestion of non-dietary items. The CNS is the target organ for chronic oral exposure to manganese. EPA (1997) effectually adopts the chronic oral RfD as sufficiently protective for subchronic oral exposure.

The NOAEL described above is associated with a dose rate of approximately 10 mg/day for an adult. However, EPA (2002) notes that normal intake levels may well exceed 10 mg/day, especially with diets containing substantial amounts of whole-grain cereals, nuts, green leafy vegetables, and tea. Adverse effects have not been reported at dietary levels of 10 mg/day. It is likely that larger dose rates are innocuous as well.

Occupational exposure to high concentrations in air induces a generally typical spectrum of neurological effects, and increased incidence of pneumonia (ACGIH, 1991). EPA (2011) presents a verified chronic inhalation RfC of 5E-5 mg/m^3 (equivalent to an inhalation RfD of 1.4E-5 mg/kg-day) based on a LOAEL for neurological effects in occupationally exposed humans and an uncertainty factor of 1000. The uncertainty factor consists of three factors of 10 each to provide additional protection for unusually sensitive individuals, to extrapolate a NOAEL from a LOAEL, and to address database limitations including the less-than-chronic periods of exposure, the lack of developmental toxicity data, and uncertainty regarding potential but unquantified differences in the toxicity of different forms of manganese. Confidence in the RfC is medium. The CNS is the target organ for inhalation exposure to manganese. The chronic inhalation RfC is adopted as sufficiently protective for subchronic inhalation exposure.

6.0 Carcinogenicity Evaluation

EPA (2011) classified manganese in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans). Quantitative cancer risk estimates are not derived for Group D chemicals.

7.0 Toxicity Summary

Noncancer Effects						Carcinogenicity				
Oral Exposure			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
1.4E-1[a]/ 2.4E-2[b]	1.4E-1[a]/ 2.4E-2[b]	CNS	5E-5/ 1.4E-4	5E-5/ 1.4E-5	CNS	D	ND	D	ND	ND

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data.
Target organ or critical effect abbreviations: CNS = central nervous system.
[a]Dietary items other than drinking water.
[b]Ingestion of environmental media and drinking water.

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Manganese***, U.S. Public Health Service, Atlanta, Georgia, September, on line.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, ACGIH, Cincinnati, Ohio, pp. 876-878.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

Keen and Leach, 1988, "Manganese," in Seiler, H.G. and H. Sigel, eds., ***Handbook on Toxicity of Inorganic Compounds***, Marcel Dekker, Inc., New York, pp. 405-415.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

VANADIUM (7440-62-2)

1.0 Introduction and Physical Properties

Vanadium is a widespread **metal**, comprising about 0.014 percent of the earth's crust (Wennig and Kirsch, 1988) with an average concentration of approximately 150 mg/kg (ATSDR, 1992). It may exist in six oxidation states (-1, 0, +2, +3, +4 and +5); +3, +4 and +5 are most important in environmental and biological media. Vanadium is always found combined in nature, generally with oxygen, and occurs in upwards of 50 different mineral ores. It is also associated with fossil fuels. Vanadium is used predominantly in the production of special steels and alloys, some of which have unique application in nuclear power technology (Lagerkvist et al., 1986; HSDB, 2011). Relevant physical properties are compiled below:

MW	log K_{ow}	H	K_d	D_a	D_w	VP	S
50.942[a] (Element)	NA	NA	155[b, c]	NA	NA	NA	Note 1[b]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; K_d = soil/water partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; NA = not applicable; ND = no data.
Note 1: Vanadium pentoxide as a typical vanadium compound: 8E+3 mg/L (reference temperature not given).
[a]Agency for Toxic Substances and Disease Registry (ATSDR), 1992, ***Toxicological Profile for Vanadium***, U.S. Department of Health and Human Services, Atlanta, Georgia, July, on line.
[b]From EPA (2011) EPISuite™ data base.

2.0 Environmental Fate and Transport

Vanadium compounds are released naturally to air through the formation of continental dust, marine aerosols, and volcanic emissions (ATSDR, 1992; HSDB, 2011). Natural release greatly exceeds anthropogenic release. The most important anthropogenic contribution is from the combustion of fuel oil and other fossil fuels, with significant local contributions also from metallurgical and other industrial operations. Most anthropogenic releases to the atmosphere occur in the form of simple or complex vanadium oxides. Vanadium exists as particulates in the atmosphere. Small particles may remain in air for long periods of time and travel long distances. Removal is limited to wet and dry deposition.

The natural release of vanadium to water and soils occurs primarily as a result of weathering of rocks and soil erosion (ATSDR, 1992; HSDB, 2011). Anthropogenic sources include deposition from the atmosphere and the production and industrial use of vanadium and its compounds. Application of mineral fertilizers may lead to the accumulation of vanadium compounds in soil. Natural releases to water and sediment greatly exceed anthropogenic sources, although water pollution in the area of heaped-up or landfilled mine waste can be extensive in mining areas.

The behavior of vanadium in soils is not yet fully understood; however, it is known that the mobility of vanadium in soils is affected by pH (ATSDR, 1992; HSDB, 2011). Vanadium is fairly mobile in neutral or alkaline soils, relative to other metals, but its mobility decreases in acidic soils. Leaching is a potentially significant process, but great variability is expected based on soil characteristics as indicated by the range for K_d given above.

Vanadium in surface water exists largely as vanadyl and vanadate species (ATSDR, 1992; HSDB, 2011). Both forms are known to bind strongly to mineral or biogenic surfaces by adsorption or complexation, reducing the amount of soluble vanadium found in water. Biochemical removal may occur in marine environments. Some marine organisms particularly, the ascidians (sea squirts), bioconcentrate vanadium and may attain body concentrations approximately 10,000 times greater than the ambient seawater. The potential for bioconcentration appears to be greater among the lower phyla.

Vanadium in freshwater has some potential for bioconcentration. A study in bluegills estimated BCFs of 51 to 92 L/kg; however, details of the study were not located (HSDB, 2011). Although empirical data are limited, it appears that biomagnification in terrestrial food chains is unlikely (ATSDR, 1992). The potential for bioconcentration in terrestrial plants appears to be greater among the lower phyla than among the seed producers. Since vanadium is unlikely to participate significantly in aquatic and terrestrial food-chain pathways relevant to humans, biotransfer factors are not compiled or estimated.

3.0 Toxicokinetics

Excretion studies with occupationally exposed humans and intratracheal administration studies with vanadyl chloride in rats suggest that pulmonary absorption occurs (ATSDR, 1992). Although quantitative data are not available, it appears that water soluble forms may be more readily absorbed from the lung. Vanadium is poorly absorbed from the GI tract (Lagerkvist et al., 1986). GI uptake of vanadium pentoxide in rats was estimated at about 2.6 percent of the administered dose. GI uptake of oxytartarovanadate by humans was estimated at 0.1 to 1 percent of the administered dose. GI absorption may be somewhat higher in the young than in adults. The International Commission on Radiological Protection (ICRP) (1960) estimate for GI absorption by humans of soluble vanadium compounds is 2 percent. Data regarding dermal uptake of vanadium were not located.

Absorbed vanadium is transported primarily in the blood plasma rather than in the cellular elements (ATSDR, 1992). Distribution following inhalation or oral exposure is generally widespread, with highest levels initially found in the lung, liver and kidney. The kidney is the primary excretory organ, which probably accounts for the relatively high levels observed in this organ during or shortly after administration. Vanadium that is not excreted eventually partitions to the skeleton where it may displace the phosphate radical and persist.

The kinetics of vanadium metabolism are not well understood. Metabolism is limited to interconversion between the vanadyl form (valence of +4) and the vanadate form (valence of +5) that presumably reaches equilibrium (ATSDR, 1992). This interconversion may occur within the GI tract as well as systemically following absorption (EPA, 2000). Vanadate is considered to be the more toxic form because it reacts with several enzymes and is a potent inhibitor of energy metabolism in cell membranes. This is a moot point, however, because of the equilibrium that would be reached following exposure to vanadium of either valence.

The kidney is the main excretory organ for systemically absorbed vanadium (ATSDR, 1992).

4.0 Dermal Exposure

The estimate of GI absorption of 2.6 percent by rats described above is recommended by EPA (2004) as the GAF of 0.026 for vanadium.

Data were not located regarding the extent of dermal uptake of vanadium from soil, and EPA (2004) provides no estimate of the extent of dermal absorption (ABS). EPA (2004) recommends that dermal uptake from soil should not be quantified for chemicals without ABS recommendations, but that these chemicals should be discussed qualitatively as a source of uncertainty. Empirical data regarding the uptake of soluble forms of vanadium from water were not located. The EPA (2004) default K_p for inorganic chemicals of 1E-3 cm/hour is selected for vanadium.

5.0 Noncancer Effects Evaluation

EPA (2011) reported the results of an unpublished study in which rats were exposed to dietary levels of 10 or 100 ppm vanadium as vanadium pentoxide (approximately 17.9 or 179 ppm vanadium pentoxide) for 2.5 years. The criteria used to evaluate vanadium toxicity were limited to growth rate, survival, and hair cystine content. The only significant change reported was a decrease in the amount of cystine in the hair of rats in the high dose group. Therefore, the lower dose level (17.9 ppm vanadium pentoxide) was designated a NOAEL. The NOAEL is equivalent to a dose rate of 0.895 mg vanadium pentoxide/kg-day, assuming rats eat food equivalent to 5 percent of their body weight each day. Application of an uncertainty factor of 100 yields the verified chronic oral RfD of 9E-3 mg vanadium pentoxide/kg-day. The oral RfD of 9E-3 mg/kg-day should be applied only to vanadium pentoxide. Confidence in the oral RfD is low. An oral chronic RfD for vanadium of 5E-3 mg/kg-day is derived from the vanadium pentoxide RfD. This is done by multiplying the vanadium pentoxide RfD (9E-3 mg/kg-day) by the molecular weight of vanadium (101.9) in the vanadium pentoxide molecule (V_sO_5) divided by the molecular weight of vanadium pentoxide (181.9) as follow: 9E-3(mg/kg-day) × 101.9/181.0 = 5E-3(mg/kg-day). This approach is also used by EPA (2010). The chronic RfD is also used as the subchronic RfD.

The only effect observed from exposure to vanadium pentoxide was reduced cystine content of the hair (EPA, 200a). It is unclear if this resulted in fragile or otherwise damaged hair shafts, and it is unclear whether it reflects altered hair follicle function or a more central effect on protein metabolism. Hair is assumed to be the target organ for vanadium.

Effects in humans exposed by inhalation include upper and lower respiratory tract irritation (ATSDR, 1992). The respiratory tract is the target organ for inhalation exposure, but the data are inadequate for derivation of an inhalation RfC or RfD.

6.0 Carcinogenicity Evaluation

No empirical information was located regarding the carcinogenicity of vanadium.

7.0 Toxicity Summary

Toxicity values for vanadium and unspeciated vanadium compounds, and for vanadium pentoxide are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfc/ sRfD	cRfC/ cRfD	TO	WOE	SFo	WOE	URFi	SFi
Vanadium and Compounds										
5E-3	5E-3	hair	ND	ND	NA	ND	ND	ND	ND	ND
Vanadium Pentoxide										
9E-3	9E-3	hair	ND	ND	NA	ND	ND	ND	ND	ND

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per milligram per cubic meter); SFi = inhalation cancer slope factor (risk per microgram per kilogram-day); ND = no data; NA = not applicable.
Target organ abbreviations: K = kidney.
[a]sRfDo and cRfDo should by multiplied by the GAF of 0.026 when applied to dermal exposure.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1992, ***Toxicological Profile for Vanadium***, U.S. Department of Health and Human Services, Atlanta, Georgia, July, on line.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

International Commission on Radiological Protection (ICRP), 1960, ***Report of Committee II on Permissible Dose for Internal Radiation. Recommendations of the ICRP***, Publ. No. 2, Pergamon Press, Oxford, England, p. 163.

Lagerkvist, B., G.F. Nordberg and V. Vouk, 1986, "Vanadium," in: Friberg, L., G.F. Nordberg and V.B. Vouk, eds., ***Handbook on the Toxicology of Metals***, Volume II, Second Edition, New York: Elsevier Science Publishers B.V., pp. 638-663.

U.S. Environmental Protection Agency (EPA), 2000, ***Provisional Toxicity Value Assessment for HWIR: RfD for Vanadium (CASRN 7440-62-2)***, National Center for Environmental Assessment, Cincinnati, Ohio, May.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2010, ***Regional Screening Level Table, User's Guide (November 2010)***, on line at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line, accessed.

Wennig, R. and N. Kirsch, 1988, "Vanadium," in Seiler, H.G. and H. Sigel, ***Handbook on Toxicity of Inorganic Compounds***, Marcel Dekker, Inc., New York, pp. 749-765.

POLYCHLORINATED BIPHENYLS (PCBs)

1.0 Introduction and Physical Properties

The nomenclature of the PCBs is somewhat unique, including the terms homologue and congener. The PCB molecule consists of two joined phenyl groups. The carbon atoms are numbered 1 through 6 on one ring and 1′ through 6′ on the other ring. Numbering proceeds consecutively starting with the carbon atom attached to the other ring. The term homologue refers to the degree of chlorination. Since one carbon atom in each phenyl group is bonded to the other ring, five carbon atoms on each phenyl group – a total of 10 carbon atoms – are available for bonding to chlorine atoms. Consequently, there are ten possible *homologues* of PCBs – monochlorinate biphenyls, dichlorinated biphenyls, through decachlorinated biphenyls. Congener refers to the exact placement of each chlorine atom. For example, there are three congeners of monochlorinated biphenyls: 2-PCB, 3-PCB and 4-PCB. The term isomer is often incorrectly used instead of congener with the PCBs. Free rotation around the C-C bond, however, precludes stereoisomerism, which limits the number of theoretically possible congeners.

The PCBs are a class of chemicals generally considered to be **SVOC**s including 209 possible individual congeners (ATSDR, 2000). The PCBs formerly manufactured and used in the U.S. are called Aroclors. The Aroclors are mixtures of several PCB congeners and related compounds. Many individual PCB congeners are common to all or many of the different Aroclors. The Aroclors differ from one another primarily in the relative proportions of the different congeners. ATSDR (2000) provides a summary of the proportion of each homologue in commercial mixtures of the various Aroclors. Of interest to this evaluation is the observation that Aroclor-1016 and Aroclor-1221 contain no homologues with 5 or more chlorines. Most Aroclors occur as oily or viscous liquids at room temperatures, although Aroclor-1260 occurs as a sticky resin. Aroclors were used as dielectric and heat exchange agents in several open and closed systems, but since the middle 1970s, use has been restricted largely to electrical transformers and capacitors.

Analysis of PCBs in environmental media is often performed using EPA Method SW8082. Method SW8082 is usually performed as a "finger printing" procedure and the results are reported as the commercial Aroclor(s) that most closely reflect the fingerprint(s) (ATSDR, 2000). Recently, however, concern has arisen that some individual PCB congeners may behave toxicologically in the same manner as the polychlorinated dibenzo-p-dioxins (PCDD), and that they may have greater toxic potency than is reflected in the toxicity assessment of the commercial Aroclors. This problem may be exacerbated by weathering, which may preferentially remove the less toxic (generally less highly chlorinated) congeners, leading to a relative concentration of the more highly chlorinated congeners. The more highly chlorinated congeners are generally the more persistent and the more toxic (ATSDR, 2000; EPA, 2011). For this reason, Method SW8082 has been expanded so that the analytical results can be reported in terms of selected specific congeners. In addition, EPA Method E1668 is a very high-resolution protocol (highly sensitive and highly selective) that reports individual congeners as well as totals for each of the homologues. Method E1668 is seldom used for environmental media, with the exception of incinerator emissions testing, because of its unusually high cost.

EPA (2000) identified 12 individual PCB congeners with dioxin-like activity. The PCB mixtures and dioxin-like congeners analyzed by the EPA methods mentioned above are compiled below:

PCB Mixture or Congener	CASRN	IUPAC No.	Method 8082	Method 1668
Aroclor-1016	12674-11-2	NA	Yes	No
Aroclor-1221	11104-28-2	NA	Yes	No
Aroclor-1232	11141-16-5	NA	Yes	No
Aroclor-1242	53469-21-9	NA	Yes	No
Aroclor-1248	12672-29-6	NA	Yes	No
Aroclor-1254	11097-69-1	NA	Yes	No
Aroclor-1260	11096-82-5	NA	Yes	No
3,3′,4,4′-Tetrachlorobiphenyl	**32598-13-3**	**77**	**Probably[a]**	**Yes**
3,4,4′,5-Tetrachlorobiphenyl	**70362-50-4**	**81**	**Probably[a]**	**Yes**
2,3,3′,4,4′-Pentachlorobiphenyl	**32598-14-4**	**105**	**Probably[a]**	**Yes**
2,3,4,4′,5-Pentachlorobiphenyl	**74472-37-0**	**114**	**Probably[a]**	**Yes**
2,3′,4,4′,5-Pentachlorobiphenyl	**31508-00-6**	**118**	**Probably[a]**	**Yes**
2′,3,4,4′,5-Pentachlorobiphenyl 2,3′,4,4′,5′-Pentachlorobiphenyl)	**65510-44-3**	**123**	**Probably[a]**	**Yes**
3,3′,4,4′,5-Pentachlorobiphenyl	**57465-28-8**	**126**	**Probably[a]**	**Yes**
2,3,3′,4,4′,5-Hexachlorobiphenyl	**38380-08-4**	**156**	**Probably[a]**	**Yes**
2,3,3′,4,4′,5′-Hexachlorobiphenyl	**69782-90-7**	**157**	**Probably[a]**	**Yes**
2,3′,4,4′,5,5′-Hexachlorobiphenyl	**52663-72-6**	**167**	**Probably[a]**	**Yes**
3,3′,4,4′,5,5′-Hexachlorobiphenyl	**32774-16-6**	**169**	**Probably[a]**	**Yes**
2,3,3′,4,4′,5,5′-Heptachlorobiphenyl	**39635-31-9**	**189**	**Probably[a]**	**Yes**
Total Monochlorobiphenyls	NA	NA	No	Yes
Total Dichlorobiphenyls	NA	NA	No	Yes
Total Trichlorobiphenyls	NA	NA	No	Yes
Total Tetrachlorobiphenyls	NA	NA	No	Yes
Total Pentachlorobiphenyls	NA	NA	No	Yes
Total Hexachlorobiphenyls	NA	NA	No	Yes
Total Heptachlorobiphenyls	NA	NA	No	Yes
Total Octachlorobiphenyls	NA	NA	No	Yes
Total Nonachlorobiphenyls	NA	NA	No	Yes
Total Decachlorobiphenyls	NA	NA	No	Yes

PCB = polychlorinated biphenyl; CASRN = Chemical Abstract Service Registry Number; IUPAC No. = congener-specific identification number assigned by the International Union of Pure and Applied Chemists. The specific congeners are sometimes called PCB-77, PCB-81, etc., and are sometimes *inappropriately* called Aroclor-77, Aroclor-81, etc. Technically, the term Aroclor should be reserved for chemical mixtures, where the name Aroclor is followed by a four-digit identifier code.
Dioxin-like congeners are bolded.
[a]Although the congeners listed have not been tested by Method 8082, it is likely that they could be quantified by the method. Other non-dioxin-like congeners can routinely be analyzed by this method.

Data regarding the physical properties of the individual PCB congeners are very limited. The physical characteristics of the Aroclor mixtures have been much more thoroughly evaluated. Although the Aroclors described below are classified as SVOCs, largely on the basis of MW, their H values suggest that volatilization could be important. Furthermore, the MW values provided are proportional averages based on the composition of the various Aroclor mixtures. Several individual PCB congeners have MW values below the limit of 200 g/mole ordinarily used to distinguish VOCs from SVOCs. For these reasons it is recommended that the Aroclors should be evaluated in exposure pathways (such as vapor intrusion into indoor air) that involve volatilization. Relevant physical properties are compiled below:

MW[a]	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
Aroclor-1016 (12674-11-2)										
257.9[b]	5.6[b]	2.9E-4[b] (25°C)	4.96[c]	4.69E-2[d] (25°C)[e]	6.8E-6[c] (25°C)	5.3E-7[b] (25°C)	4.2E-1[b] (25°C)	340.50[f]	475.22[f]	1.8E+4[f]
Aroclor-1221 (11104-28-2)										
200.7[b]	4.7[b]	7.36E-4[b] (25°C)	2.44[c]	5.54E-2[d] (25°C)[e]	7.5E-6[c] (25°C)	8.8E-6[b] (25°C)	5.9E-1[b] (24°C)	571[b]	ND	ND
Aroclor-1232 (11141-16-5)										
232.2[B]	5.1[B]	8.64E-4[c] (25°C)[e]	2.83[c]	5.03E-2[d] (25°C)[e]	7.2E-6[c] (20°C)	5.34E-6[b] (25°C)	4.5E-1[b] (25°C)	581[b]	ND	ND
Aroclor-1242 (53469-21-9)										
266.5[b]	5.6[b]	5.2E-4[b] (25°C)	4.59[c]	4.59E-2[d] (25°C)[e]	6.1E-6[c] (20°C)	5.34E-7[b] (25°C)	2.4E-1[b] (25°C)	345.5[f]	482.20[f]	1.8E+4[f]
Aroclor-1248 (12672-29-6)										
299.5[g]	6.2[g]	2.8E-3[g] (25°C)	5.64[c]	4.24E-2[d] (25°C)[e]	6.6E-6[c] (20°C)	6.5E-7[g] (25°C)	5.7E-2[g] (24°C)	631[g]	ND	ND
Aroclor-1254 (11097-69-1)										
328[b]	6.5[b]	2.0E-3[b] (25°C)	5.0[c]	3.99E-2[d] (25°C)[e]	5.6E-6[c] (20°C)	1.01E-7[b] (25°C)	3.5E-2[b] (24°C)	377.50[f]	512.27[f]	1.9E+4[f]
Aroclor-1260 (11096-82-5)										
375.7[b]	6.8[b]	4.6E-3[b] (25°C)	6.42[c]	3.65E-2[d] (25°C)[e]	5.3E-6[c] (20°C)	5.33E-8[b] (25°C)	8.0E-2[b] (24°C)	402.50[f]	539.37[f]	1.9E+4[f]
Aroclor-1262 (1336-36-3)										
389[b]	ND	ND	ND	3.57E-2[d] (25°C)[e]	4.13E-6[d] (25°C)[e]	ND	5.2E-2[b] (24°C)	680.7[b]	ND	ND
Aroclor-1268 (11100-14-4)										
453[b]	ND	ND	ND	3.22E-2[d] (25°C)[e]	3.73E-6[d] (25°C)[e]	ND	3.0E-1[b] (24°C)	ND	ND	ND

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point of pure liquid compound (°K); T_c = critical temperature (°K); $\Delta H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); I = insoluble; ND = no data.

[a]Average molecular mass for the proportions of individual congeners in the commercial product.

[b]Agency for Toxic Substances and Disease Registry (ATSDR), 2000, ***Update Toxicological Profile for Polychlorinated Biphenyls***, U.S. Department of Health and Human Services, Atlanta, Georgia, November, on line.

[c]Montgomery, J.H., 1996, ***Groundwater Chemicals Desk Reference, Second Edition***, Lewis Publishers, New York.

[d]Calculated as described in Introduction to Toxicological profiles.

[e]Assumed.

[f]U.S. Environmental Protection Agency (EPA), 1997, ***User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings***, prepared by Environmental Quality Management, Inc. for the Office of Emergency and Remedial Response, Washington, D.C., September.

[g]Earlier version (1995 Draft for Public Comment) of ATSDR Toxicological profile.

[h]U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*.

2.0 Environmental Fate and Transport

Former PCB releases occurred as a result of their manufacture, use, disposal, and leakage from damaged PCB-containing equipment (ATSDR, 2000). Currently the major source of PCB release to the environment is recycling of PCBs previously introduced into the environment, which involves volatilization from ground surfaces (water, soil) into the atmosphere with subsequent removal from the atmosphere via wet/dry deposition, followed by volatilization (HSDB, 2011). PCBs are also currently released to the environment from landfills containing PCB waste materials and products, incineration of municipal refuse and sewage sludge, and improper (or illegal) disposal of PCB materials, such as waste transformer fluid, to open areas.

Major sources to air include emissions from the overhaul, repair or reuse of PCB-containing items, and the recycling of previously released PCBs described above (ATSDR, 2000; HSDB, 2011). The vapor pressures of the PCBs indicate that they would exist primarily in the vapor-phase in the atmosphere; monitoring data have shown that between 87 and 100% of the PCBs in air are in the vapor-phase. Vapor pressure of the PCBs generally decreases with an increase in the extent of chlorination; therefore, the more highly chlorinated PCBs are more likely to be associated with the particulate phase in air than are the lesser chlorinated PCBs. Physical removal of PCBs in the atmosphere is accomplished by wet and dry deposition; dry deposition occurs only for PCBs in the particulate phase.

Major sources to soil include leaks or discharges from PCB-containing items and deposition from the atmosphere (ATSDR, 2000). PCBs sorb tightly to constituents of soil with adsorption generally increasing with the degree of chlorination. Although the lesser chlorinated biphenyls may exhibit some mobility in soil, PCBs generally will not leach significantly in most aqueous soil systems. In the presence of organic solvents, PCBs may leach quite rapidly through soil. Vapor loss of PCBs from soil surfaces appears to be an important loss mechanism with the rate of volatilization decreasing with increasing chlorination. Although the volatilization rate may be low, the total loss by volatilization over time may be significant because of the persistence and stability of the PCBs. In general, persistence of the PCBs increases with an increase in the degree of chlorination (ATSDR, 2000; HSDB, 2011). Mono-, di- and trichlorinated biphenyls (Aroclors-1221 and -1232) biodegrade relatively rapidly, tetrachlorinated biphenyls (Aroclors-1016 and -1242) biodegrade slowly, and higher chlorinated biphenyls (Aroclors-1248, -1254 and -1260) are quite resistant to biodegradation. The position of chlorination within a given homologue also determines the extent of biodegradation. Although biodegradation of the more highly chlorinated congeners may occur very slowly on an environmental basis, no other degradation mechanisms have been shown to be important in soil systems; therefore, biodegradation may be the ultimate degradation process in soil.

Former sources of PCBs to surface water include waste streams and discharges from waste water treatment plants (ATSDR, 2000). Currently, direct deposition, runoff and erosion probably predominate. Removal from water involves sorption to particles and sedimentation, as well as volatilization.

The PCBs are among the compounds that bioaccumulate in food chain pathways and are of special concern for biomagnification from sediment in benthic fish. Biotransfer factors for the PCBs are compiled below:

BSAF	Bpr[a,b]	Bpv[a,b]	Bb[a]	Bm[a]
Aroclor-1016				
See below	2.24E-2	2.24E-2	1.00E-2	3.16E-3
Aroclor-1221				
See below	7.44E-2	7.44E-2	1.26E-3	3.98E-4
Aroclor-1232				
See below	4.37E-2	4.37E-2	3.16E-3	1.00E-3
Aroclor-1242				
See below	2.24E-2	2.24E-2	1.00E-2	3.16E-3
Aroclor-1248				
See below	1.01E-2	1.01E-2	3.98E-2	1.26E-2
Aroclor-1254				
See below	6.78E-3	6.78E-3	7.94E-2	2.51E-2
Aroclor-1260				
See below	4.55E-3	4.55E-3	1.58E-1	5.01E-2
Aroclor-1262				
See below	ND	ND	ND	ND
Aroclor-1268				
See below	ND	ND	ND	ND

BSAF = biota-sediment accumulation factor, unitless; Bpr = soil-to-plant (reproductive portions) biotransfer factor, unitless; Bpv = soil-to-plant (vegetative portions) biotransfer factor, unitless; Bb = soil-to-beef biotransfer factor, days/kg; Bm = soil-to-milk biotransfer factor, days/kg; ND = no data.
[a]Calculated as described in Introduction to the Toxicological profiles.
[b]The methodology for estimating biotransfer of organic chemicals to plants does not differentiate vegetative and reproductive portions.

EPA (1995) reported a biota/sediment absorption factor (BSAF) for total PCBs of 1.85 for trout in the Great Lakes ecosystem. The BSAF of 1.85 is applied to all PCBs in this evaluation.

3.0 Data for Evaluating Dermal Exposure

Toxicokinetic data from laboratory animals suggest that the efficiency of GI absorption is roughly inversely related to the degree of chlorination (ATSDR, 2000). The GI absorption of mono- to hexachlorinated biphenyls exceeds 90 percent. Dichlorobiphenyl GI absorption efficiency is approximately 95 percent, but the absorption efficiency of octachlorobiphenyl approximates only 75 percent. GI absorption efficiency of Aroclor-1254 approximates 85.4 percent in ferrets and greater than 90 percent in monkeys. EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for the PCBs and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

The PCBs appear to be readily absorbed by the skin when applied as neat compound or mixed with a suitable vehicle (ATSDR, 2000), but efficiency falls when soil is the medium of exchange. The EPA (2004) recommended ABS of 0.14 for PCBs is used in this evaluation. EPA (2004) provides values for K_p, τ, FA and B for 4-chlorobiphenyl and hexachlorobiphenyl. Generally, the more highly chlorinated PCB congeners are the more persistent in the environment; therefore, the values for hexachlorobiphenyl provided below are applied to all PCBs in this evaluation.

Chemical	K_p	τ	FA	B
Hexachlorobiphenyl	4.3E-1	1.13E+1	0.5	3.2
K_p = permeability coefficient (cm/hour); τ= lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).				

4.0 Noncancer Effects Evaluation

The acute oral toxicity of the PCBs is low to moderate, as indicated by LD_{50} values in laboratory animals ranging from 750 mg/kg (mink) to 4250 mg/kg (rats) (ATSDR, 2000). Mink appear to be unusually sensitive, which is also true for prolonged oral exposure. Death appears to be due to respiratory depression and dehydration from diarrhea.

The best known incident involving oral exposure of humans to PCBs is the "Yusho" incident in Japan, in which persistent chloracne, gastrointestinal irritation and central nervous symptoms followed ingestion of cooking oil contaminated with PCBs (Gaffey, 1983). Further investigation, however, revealed that concentrations of polychlorinated dibenzofurans (PCDF) and polychlorinated quaterphenyls in the cooking oil were similar to those of PCBs, which confounds interpretation of the reported observations and symptoms.

Prolonged oral exposure of laboratory animals to various Aroclors leads to liver damage, signs of chloracne, immunological effects, and neurological impairment, particularly of the young (EPA, 2011). A verified oral RfD for Aroclor-1254 of 2E-5 mg/kg-day for chronic oral exposure is based on a LOAEL of 5E-3 mg/kg-day associated with chloracne and related signs and immunological effects in monkeys treated with the test material in gelatin capsules for over five years. An uncertainty factor of 300 was applied. Confidence in the RfD is medium. The immune system and skin are considered the target organs for prolonged oral exposure to Aroclor-1254.

EPA (1997) derived a provisional RfD for subchronic oral exposure to Aroclor-1254 of 5E-5 by applying an uncertainty factor of 100 to the LOAEL from the monkey study described above.

A verified oral RfD of 7E-5 mg/kg-day for Aroclor-1016 is based on a NOAEL of 7E-3 mg/kg-day in a perinatal and neurobehavioral toxicity study in monkeys (EPA, 2011). An uncertainty factor of 100 was applied to the NOAEL. The uncertainty factor of 100 consists of factors of 3 each to extrapolate from monkeys to humans, to provide greater protection for more sensitive humans, to account for deficiencies in the database, and to expand from a subchronic study to chronic exposure. The LOAEL (2.8E-2 mg/kg-day) was associated with low birth weights. The fetus is considered to be the most sensitive member of the population. The fetus and nervous system are selected as “target organs” for prolonged oral exposure to Aroclor-1016. Confidence in the oral RfD is medium.

There is no EPA-derived subchronic oral RfD for exposure to Aroclor-1016. However, a preliminary RfD can be derived from the NOAEL of 7E-3 mg/kg-day in the monkey study described above by application of an uncertainty factor of 30. The uncertainty factor of 30 includes all the factors described above except the factor of 3 to expand from subchronic to chronic exposure. The preliminary subchronic oral RfD so derived is 2.3E-4 mg/kg-day, which is expressed as 2E-4 mg/kg-day when rounded to one significant figure.

The similarities in the nature of the adverse effects and the thresholds for these effects for various Aroclors suggest that the adverse effects and thresholds across all the Aroclors may be similar. That this may be true is supported by the fact that many of the same PCB congeners are present in the different Aroclors, which differ from one another primarily only in the relative proportions of the individual congeners. Therefore, it is reasonable to apply the RfDs described above to any of the Aroclor mixtures, or to total PCBs. The chronic and subchronic oral RfDs developed for Aroclor-1016 rather than those developed for Aroclor-1254 are selected as surrogates for evaluating the adverse effects of the other Aroclors or total PCBs. The RfDs developed for Aroclor-1016 are preferred because they include less uncertainty than the RfDs developed for Aroclor-1254. Therefore, the verified chronic oral RfD of 7E-5 mg/kg-day and the preliminary subchronic oral RfD of 2E-4 mg/kg-day developed for Aroclor-1016 are applied to the Aroclors other than Aroclor-1254 or to total PCBs.

Occupational exposure to PCBs, which involved both inhalation and dermal exposure, was associated with upper respiratory tract and ocular irritation, loss of appetite, liver enlargement and increased serum concentrations of liver enzymes, skin irritation, rashes and chloracne, and, in heavily exposed female workers, decreased birth weight of their infants (ATSDR, 2000). Concurrent exposure to PCB contaminants, such as polychlorinated dibenzofurans, confounds the interpretation of the occupational exposure studies. Rats, mice, rabbits and guinea pigs intermittently exposed to Aroclor-1254 vapors exhibit moderate liver degeneration, decreased body weight gain and slight renal tubular degeneration; however, the accuracy of the reported exposure concentration is in doubt. Neither verified nor provisional chronic inhalation RfC values are available.

5.0 Carcinogenicity Evaluation

EPA (2011) declined to evaluate the carcinogenicity of the individual Aroclor mixtures. Instead, EPA (2011) classified PCBs in cancer weight-of-evidence Group B2 (probable human carcinogen) based on adequate evidence for liver tumors in laboratory animals and inadequate data in humans. EPA (2011) established a three-tiered approach for estimating the cancer potency of exposure to PCBs.

<u>High-Risk Tier</u> A SF of 2.0E+0 per mg/kg-day is verified as an upper-bound potency factor for exposure to PCBs in the high-risk tier (EPA, 2011). The high-risk tier includes ingestion in the food chain, incidental ingestion of soil or sediment, inhalation of dust or aerosol, or dermal contact with soil or sediment if a dermal absorption factor is applied. The high-risk SF of 2.0E+0 per mg/kg-day is used for mixtures containing any congeners considered to be persistent or acting in a dioxin-like manner, and for any early life exposures (e.g., residential scenario, which includes both adults and children). In this context, persistent congeners are those with five or more chlorines. The 12 PCB congeners considered to act in a dioxin-like manner were identified above. The SF of 2.0E+0 per mg/kg-day is equivalent to a URF (for dust or aerosol inhalation) of 5.7E-4 per $\mu g/m^3$.

The high-risk tier SF for central tendency (CT) assessment is 1.0E+0 per mg/kg-day. The SF of 1.0E+0 per mg/kg-day is equivalent to a URF (for dust or aerosol inhalation) of 2.9E-4 per $\mu g/m^3$.

Low-Risk Tier EPA (2011) verified an upper-bound SF of 4E-1 per mg/kg-day for the low-risk tier, which includes ingestion of water-soluble congeners (assumed to be PCBs detected in drinking water), inhalation of evaporated congeners, and dermal exposure if no absorption factor is applied. The SF of 4E-1 per mg/kg-day is equivalent to a URF for vapor inhalation of 1E-4 per $\mu g/m^3$. A SF of 3E-1 per mg/kg-day is recommended for the low-risk CT evaluation. The SF of 3E-1 per mg/kg-day is equivalent to a URF (for vapor inhalation) of 9E-5 per $\mu g/m^3$.

Lowest-Risk Tier EPA (2011) verified an upper-bound SF of 7E-2 per mg/kg-day for the lowest-risk tier, which is restricted to data sets for which homologue-or congener-specific data verify that congeners containing 5 or more chlorines constitute less than 0.5 percent of the total PCBs. The SF of 7E-2 per mg/kg-day is equivalent to a URF for inhalation of 2E-5 per $\mu g/m^3$. These values are used in for Aroclor 1016. An SF of 4E-2 per mg/kg-day is recommended for the low-risk CT evaluation. The SF of 4E-2 per mg/kg-day is equivalent to a URF for vapor inhalation of 1E-5 per $\mu g/m^3$.

An alternative method of PCB cancer risk assessment was proposed by EPA (2000, 2011) for sites where congener-specific analytical results are available. This method involves application of toxicity equivalency factors (TEF) adopted by EPA (2000) to the 12 dioxin-like congeners identified above. TEFs are factors that express the toxicity of the dioxin-like congeners relative to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD or "dioxin"), the reference compound. EPA (1997) presented a provisional oral and inhalation SF for 2,3,7,8-TCDD of 1.5E+5 per mg/kg-day. As explained in the toxicological profile for polychlorinated dibenzo-p-dioxins and dibenzofurans, the inhalation SF is more accurately expressed as 1.1E+5 per mg/kg-day, which is equivalent to 3.3E+1 per $\mu g/m^3$, or 3.3E+4 per mg/m^3. Application of the EPA (2000) TEFs to the dioxin-like PCB congeners yields the cancer potency factors presented below:

Dioxin-Like PCB Congener	IUPAC No.	TEF	SFo	URFi	SFi
3,3′,4,4′-Tetrachlorobiphenyl	77	0.0001	1.5E+1	3.3E+0	1.1E+1
3,4,4′,5-Tetrachlorobiphenyl	81	0.0001	1.5E+1	3.3E+0	1.1E+1
2,3,3′,4,4′-Pentachlorobiphenyl	105	0.0001	1.5E+1	3.3E+0	1.1E+1
2,3,4,4′,5-Pentachlorobiphenyl	114	0.0005	7.5E+1	1.7E+1	5.5E+1
2,3′,4,4′,5-Pentachlorobiphenyl	118	0.0001	1.5E+1	3.3E+0	1.1E+1
2′,3,4,4′,5-Pentachlorobiphenyl 2,3′,4,4′,5′-Pentachlorobiphenyl)	123	0.0001	1.5E+1	3.3E+0	1.1E+1
3,3′,4,4′,5-Pentachlorobiphenyl	126	0.1	1.5E+4	3.3E+3	1.1E+4
2,3,3′,4,4′,5-Hexachlorobiphenyl	156	0.0005	7.5E+1	1.7E+1	5.5E+1
2,3,3′,4,4′,5′-Hexachlorobiphenyl	157	0.0005	7.5E+1	1.7E+1	5.5E+1
2,3′,4,4′,5,5′-Hexachlorobiphenyl	167	0.00001	1.5E+0	3.3E-1	1.1E+0
3,3′,4,4′,5,5′-Hexachlorobiphenyl	169	0.01	1.5E+3	3.3E+2	1.1E+3
2,3,3′,4,4′,5,5′-Heptachlorobiphenyl	189	0.0001	1.5E+1	3.3E+0	1.1E+1

IUPAC No. = unique sequentially numbered congener identifier proposed by the International Union of Pure and Applied Chemists; TEF = toxicity equivalency factor (EPA, 2000); SFo = oral slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per milligram per cubic meter); SFi = inhalation slope factor (risk per milligram per kilogram-day).

6.0 Toxicity Summary

Cancer potency factors for the dioxin-like congeners are summarized above. Toxicity values for PCBs other than the dioxin-like congeners, are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
Aroclor-1016[b]										
2E-4	7E-5	F	ND	ND	NA	Please see below.				
Aroclor-1254										
5E-5	2E-5	Is, S	ND	ND	NA	Please see below.				
PCBs, High-Risk, Upper Bound (Reasonable Maximum Exposure) Assumptions										
Please see above, including footnote "b."						B2	2.0E+0	B2	5.7E-1[c]	2.0E+0[c]
PCBs, High-Risk, Central Tendency Exposure Assumptions										
Please see above, including footnote "b."						B2	1.0E+0	B2	2.9E-1[c]	1.0E+0[c]
PCBs, Low-Risk, Upper Bound (Reasonable Maximum Exposure) Assumptions										
Please see above, including footnote "b."						B2	4E-1	B2	1E-1[d]	4E-1[d]
PCBs, Low-Risk, Central Tendency Exposure Assumptions										
Please see above, including footnote "b."						B2	3E-1	B2	9E-2[d]	3E-1[d]
PCBs, Lowest-Risk, Upper Bound (Reasonable Maximum Exposure) Assumptions										
Please see above, including footnote "b."						B2	7E-2	B2	2E-2	7E-2
PCBs, Lowest-Risk, Central Tendency Exposure Assumptions										
Please see above, including footnote "b."						B2	4E-2	B2	1E-2	4E-2

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per milligram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data.
Target organ abbreviations: F = unborn child; Is = immune system; S = skin; NA = not applicable.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.
[b]sRfDo and cRfDo derived for Aroclor-1016 should be applied to all other Aroclor mixtures except Aroclor-1254. They should also be applied to total PCBs, but not to specific PCB homologues congeners.
[c]Reasonable maximum exposure evaluation of inhalation pathways including dusts or aerosols.
[d]Reasonable maximum exposure evaluation of inhalation pathways limited to vapors, excluding dusts or aerosols.

7.0 PCB Risk Assessment

The approach to risk assessment of PCB-contaminated sites depends on the analytical data available. Typically, PCB analysis is limited to Method 8082 for the seven commonly encountered Aroclors. When this is the case, the hazard associated with noncancer effects is evaluated with the oral RfDs provided in the table above. Cancer risk is evaluated with the upper bound (reasonable maximum exposure) SFo and URFi or SFi from the "High-Risk" or "Low-

Risk" scenarios, depending on the Aroclors identified, and the receptors and exposure pathways evaluated.

If homologue-specific analytical results are available in addition to results for the seven common Aroclors, it will be necessary to decide which is the better data set. This decision will depend, at least in part, on the samples included in each data set. Generally, the data set that better represents contamination across the area of investigation or a given exposure unit should be used in the risk assessment. If the same samples were analyzed for both Aroclors and specific homologues so that representativeness is not an issue, EPA (2011) generally considers that the homologue data are preferable because they are based on greater sensitivity (lower reporting limits) and are more likely to reflect selective removal of the more labile and mobile congeners due to weathering. Homologue-specific analytical results in the absence of data for the seven common Aroclors can be evaluated directly in the risk assessment.

The homologues should not be evaluated individually for noncancer hazard using the oral RfDs provided above. However, their sum (total PCBs) can be evaluated with the oral RfD for Aroclor-1016, assuming that the total PCBs reflect the characteristics of a mixture not unlike one or more of the Aroclors. If this assumption is not reasonable, the reason should be clearly stated, total PCBs should not be evaluated for noncancer hazard, and the uncertainty imparted to the risk assessment (probably a non-conservative bias) should be discussed. For example, it might be that only the most highly chlorinated homologues persist and are identified from an "old" release.

Cancer risk is estimated for total PCBs rather than the individual homologues. If the penta-, hexa-, hepta-, octa-, nona- and deca-chlorinated homologues together constitute not more than 0.5 percent of the total PCB, the SFo and URFi or SFi for the "Lowest-Risk" scenario should be used. If the penta-, hexa-, hepta-, nona- and deca-chlorinated homologues together constitute more than 0.5 percent of the total PCB, the SFo and URFi or SFi for the "High-Risk" or "Low-Risk" scenario should be used, depending on the receptors and exposure pathways evaluated.

It is unlikely that congener-specific data will be the only PCB data available. Should that be the case, however, the noncancer hazard can be estimated for total PCBs as described in the previous paragraph. For cancer risk assessment, the dioxin-like congeners should be assessed as explained below. The non-dioxin-like congeners should be summed. If the penta-, hexa-, hepta-, nona- and deca-chlorinated congeners together constitute not more than 0.5 percent of the total PCB, the SFo and URFi or SFi for the "Lowest-Risk" scenario should be used. If the penta-, hexa-, hepta-, nona- and deca-chlorinated congeners together constitute more than 0.5 percent of the total PCB, the SFo and URFi or SFi for the "High-Risk" or "Low-Risk" scenario should be used, depending on the receptors and exposure pathways evaluated. The cancer risks from the non-dioxin-like and the dioxin-like congeners (see next paragraph) should be summed.

It is more likely that limited congener-specific data will be available *in addition to* data for the Aroclors or homologues. (Limited in the number of congeners analyzed and/or the number of samples analyzed for individual congeners.) For cancer risk assessment, EPA (2011) recommends evaluating the Aroclors or homologues as described above, after reducing their exposure-point concentrations by the contribution from the dioxin-like congeners. In most cases the concentrations of the dioxin-like congeners will be so much lower than the concentrations of the Aroclors or homologues that their subtraction would make little difference. The cancer risk

for the dioxin-like congeners is assessed by using the TEF-based SFo and URFi or SFi values presented above. The two sets of risk estimates are then summed.

The newer trends in PCB analysis and risk assessment introduce additional sources of uncertainty to the assessment. PCBs tend to be somewhat ubiquitous because of their once-common use, potential for widespread dispersion, and persistence in environmental media (ATSDR, 2000). Method 1668 is a high-resolution method that is likely to identify very low "anthropogenic background" levels of PCBs that may not be reflected in the results of Aroclor analysis using Method 8082. This may impart an overly conservative bias to the risk assessment. Another source of uncertainty may arise from analyzing only a limited number or proportion of PCB-bearing samples for individual congeners. The limited analysis could impart either a conservative or non-conservative bias to the risk assessment, depending on the relative level of contamination in the samples selected for analysis of individual congeners.

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Polychlorinated Biphenyls***, U.S. Public Health Service, Atlanta, Georgia, November, on line.

Gaffey, W.R., 1983, "The epidemiology of PCBs," In: ***PCBs: Human and Environmental Hazards***, F.M. D'itri and M.A. Kamrin, Eds., Boston: Butterworth Publishers.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

U.S. Environmental Protection Agency (EPA), 1989, ***Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002, December.

U.S. Environmental Protection Agency (EPA), 1995, ***Great Lakes Water Quality Initiative, Technical Support Document for the Procedure to Determine Bioaccumulation Factors***, EPA.820.8.95.CC5, PB95-187290.

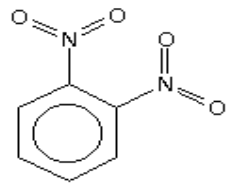
U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C. 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 2000, ***Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds. Part II: Health Assessment for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and Related Compounds***, Draft Final, National Center for Environmental Assessment, May.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

DINITROBENZENES



1,2-Dinitrobenzene

1.0 Introduction and Physical Properties

The dinitrobenzenes are **SVOCs** that occur as white to pale yellow crystals at ambient temperatures (HSDB, 2011). The dinitrobenzenes exist in three isomeric forms: 1,2-dinitrobenzene (ortho- or o-dinitrobenzene), 1,3-dinitrobenzene (meta- or m-dinitrobenzene), and 1,4-dinitrobenzene (para- or p-dinitrobenzene). These compounds are used in organic synthesis, particularly in the manufacture of dyes, in explosives (2,4,6-trinitrotoluene), and as a camphor substitute in the production of celluloids (ACGIH, 1991; ATSDR, 1995; HSDB, 2011; Lewis, 1997). 1,3-Dinitrobenzene, the isomer most frequently encountered in the environment, is also used in the preparation of m-phenylenediamine, in the detection of 17-ketosteroids, and in the production of aminocresols and other aromatic amines (HSDB, 2011). Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
1,2-Dinitobenzene (528-29-0)										
1.68.11	1.69	5.3E-8 (25°C)	2.30	6.24E-2[a] (25°C)[b]	7.22E-6[a] (25°C)[b]	5.99E-8 (25°C)	1.33E+2[c] (25°C)	NA	NA	NA
1,3-Dinitrobenzene (99-65-0)										
1.68.11	1.49	4.9E-8 (25°C)	2.19	6.24E-2[a] (25°C)[b]	7.22E-6[a] (25°C)[b]	2.63E-7 (25°C)	5.33E+2[c] (25°C)	NA	NA	NA
1,4-Dinitrobenzene (98-06-6)										
1.68.11	1.46	8.4E-8 (25°C)	2.17	6.24E-2[a] (25°C)[b]	7.22E-6[a] (25°C)[b]	8.60E-8 (25°C)	6.9E+1[c] (25°C)	NA	NA	NA

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);)$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); ND = no data; NA = not applicable.
Note: Source of above values, except as footnoted: EPA (2011) EPISuite™ data base.
[a]Calculated as described in Introduction to Toxicity Profiles.
[b]Assumed standard temperature.
[c]Hazardous Substances Data Base (HSDB), 2011, National Library of Medicine, on line.

2.0 Environmental Fate and Transport

Environmental release of the dinitrobenzenes may result from their use as intermediates in organic syntheses, during the production of 2,4,6-trinitrotoluene (TNT) and in the production of dyes (ATSDR, 1995; HSDB, 2011). Its presence in environmental media at former ordnance works may reflect its formation as a degradation product of TNT or other nitroaromatic explosive compounds.

Dinitrobenzene released to soil may adsorb to clay but adsorption to soils that are not predominantly clay is expected to be weak (HSDB, 2011). Therefore, the dinitrobenzenes are expected to be mobile or highly mobile in many soils and may readily leach to groundwater.

Volatilization from soil surfaces may occur but this expected to be slow. Reduction to aromatic amines may occur under anaerobic conditions.

The dinitrobenzenes are expected to exist largely in the vapor phase in air (ATSDR, 1995). These chemicals are expected to react with photochemically generated hydroxyl radicals with an estimated half-life of upwards of 500 days (HSDB, 2011). Direct photolysis in the atmosphere may also occur, but a rate cannot be estimated.

The dinitrobenzenes may biodegrade in water and volatilization may occur, but these removal processes are expected to be slow (HSDB, 2011). Direct photolysis may also occur, but rate data are not available. These compounds are not expected to partition strongly to sediment.

The low log K_{ow} values for these compounds suggest that bioconcentration or bioaccumulation is unlikely to be important (HSDB, 2011). Empirical data for 1,4-dinitrobenzene supports this assumption; therefore, biotransfer factors are not estimated for the dinitrobenzenes.

3.0 Toxicokinetics

Toxicokinetic data for the dinitrobenzenes are limited to the 1,3-isomer. Occupational studies associate exposure to 1,3-dinitrobenzene with cyanosis resulting from conversion of hemoglobin to methemoglobin, indicating that uptake through the respiratory tract is significant (ATSDR, 1995). A significant contribution from dermal uptake cannot be ruled out.

Urinary excretion data from rabbits given single oral doses of 1,3-dinitrobenzene indicate that at least 65 to 93 percent of the ingested dose is absorbed (ATSDR, 1995). Dermal uptake of 1,3-dinitrobenzene appears to be substantial as indicated by the observation of cyanosis in occupational exposure where dermal contact was known to occur and in a volunteer who applied the compound in ointment to his skin. Experiments with solutions applied to the skin of guinea pigs suggest that the nature of the solvent appears to influence the rate of dermal uptake.

Data regarding the tissue distribution of absorbed dinitrobenzenes were not located.

Studies with 1,3-dinitrobenzene in rats indicate that reduction of one of both nitro groups to the corresponding amino moiety is the first step in dinitrobenzene metabolism (ATSDR, 1995). The amino group(s) thus formed are subject to acetylation or conjugation with glucuronic acid or sulfate. Ring hydroxylation and oxidative remove of amine groups are relatively minor pathways in rats. Comparative studies indicate that hamsters are considerably less sensitive than rats to the toxicity of 1,3-dinitrobenzene. This may be attributed to the increased rate of ring hydroxylation by hamsters compared with rats; ring hydroxylation may hasten conjugation and excretion thereby reducing toxicity.

Excretion of metabolites of 1,3-dinitrobenzene is predominantly through the urine (ATSDR, 1995).

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete.

Therefore, no GAF is developed for the dinitrobenzenes and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Data for the 1,3-isomer indicate that the dinitrobenzenes are readily absorbed through the skin (ATSDR, 1995). However, data regarding the extent of dermal uptake from soil were not located. In the absence of empirical data, the EPA (2004) default ABS of 0.1 for SVOCs is selected for this evaluation.

t*, K_p, τ, FA and B values are estimated by the EPA (2004) methodology as follows:

Chemical	t*	K_p	τ	FA	B
1,2-Dinitrobenzene	2.20	2.37E-3	0.92	1	0
1,3-Dinitrobenzene	2.20	1.75E-3	0.92	1	0
1,4-Dinitrobenzene	2.20	1.67E-3	0.92	1	0
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); □ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

Acute oral LD_{50} values are limited to 83 mg/kg for 1,3-dinitrobenzene in rats (ATSDR, 1995; HSDB, 2011). Acute exposure is associated with cyanosis resulting from the oxidation of hemoglobin to methemoglobin in the erythrocytes. Methemoglobin is unable to release oxygen to the tissues resulting in tissue anoxia. Doses approximately one-half the oral LD_{50} are also associated with testicular degeneration and impaired fertility.

Prolonged oral exposure of laboratory animals to 1,3-dinitrobenzene is associated with reduced blood hemoglobin concentrations, testicular degeneration, and equivocal evidence of neurotoxicity (ATSDR, 1995; EPA, 2011). EPA (2011) verified an RfD for chronic oral exposure of 1E-4 mg/kg-day based on a NOAEL of 3 ppm (0.4 mg/kg-day) in a 16-week drinking water study in male and female rats. An uncertainty factor of 3000 (10 for extrapolation from subchronic to chronic exposure, 10 for extrapolation across species, 10 for sensitive human subgroups, and 3 for the lack of chronic and reproductive toxicity data) was applied to the NOAEL to derive the RfD. The LOAEL, 8 ppm (1.1 mg/kg-day), was associated with increased spleen weights, an indication of accelerated erythrocyte turnover. The concentration of 20 ppm (2.7 mg/kg-day) was associated with decreased body weight gain in females, decreased hemoglobin concentrations and testicular atrophy in males, and splenic enlargement and hemosiderin deposits in rats of either sex. The erythrocyte is the more sensitive target organ for prolonged oral exposure to 1,3-dinitrobenzene. Effects on the spleen are judged to be secondary to erythrocyte destruction. Confidence in the verified chronic oral RfD is low.

Data regarding the toxicity of prolonged oral exposure to the other dinitrobenzene isomers were not located in the available literature. EPA (1997) derived provisional oral RfD values for 1,2-dinitrobenzene and 1,4-dinitrobenzene of 1E-4 mg/kg-day by analogy to 1,3-dinitrobenzene, which are the values currently listed on the EPA (2011) Regional Screening Level Table.

Human (occupational) exposure to the dinitrobenzenes is associated with effects on the liver, aplastic anemia, yellowing of the skin, cornea and conjunctiva, and several overt symptoms

including headache, burning pain and paresthesias in the feet, ankles, hands, and forearms, cyanosis, visual disturbance, central scotomas, bad taste, burning mouth, and dry throat (ACGIH, 1991; HSDB, 2005). The skin, conjunctiva, and ocular fundus may show bluish discoloration from formation of methemoglobin. Vision has been affected in numerous cases of occupational exposure. The vision fields have been slightly contracted, and visual acuity has been much reduced, with central scotomas, particularly for red and green. Partial optic atrophy has been observed in some cases. Dermal exposure is thought to play a major role in the effects associated with occupational exposure (ACGIH, 1991). The data are insufficient for development of an inhalation RfC for any of the dinitrobenzenes.

6.0 Carcinogenicity Evaluation

EPA (2011) classified 1,2- and 1,3-dinitrobenzene in weight-of-evidence cancer Group D – not classifiable as to human carcinogenicity – because of a lack of relevant human or animal data. Data regarding the carcinogenicity of 1,4-dinitrobenzene were not located. URFs and SFs are not available for any of the dinitrobenzenes.

7.0 Toxicity Summary

Toxicity values for the dinitrobenzenes are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
1,2- and 1,3-Dinitrobenzene										
1E-3	1E-4	E,Sp	ND/ ND	ND/ ND	NA	D	NA	D	NA	NA
1,4-Dinitrobenzene										
1E-3	1E-4	E,Sp	ND/ ND	ND/ ND	NA	ND	ND	ND	ND	ND

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: E = erythrocyte, Sp = Spleen.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1995, ***Toxicological Profile for 1,3-Dinitrobenzene and 1,3,5-Trinitrobenzene***, U.S. Department of Health and Human Services, June, on line.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, Cincinnati, Ohio, pp. 502-503.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

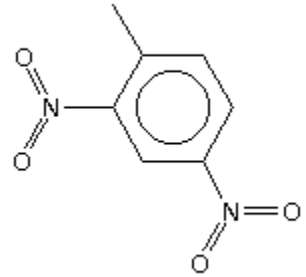
Lewis, R.J., Sr., 1997, ***Hawley's Condensed Chemical Dictionary***, Thirteenth Edition, John Wiley & Sons, Inc., New York, p. 405.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

DINITROTOLUENE (DNT)



(2,4-Dinitrotoluene)

1.0 Introduction and Physical Properties

The dinitrotoluenes (DNT) are **SVOCs** that occur as yellow to orange to red needles or crystals at ambient temperatures (HSDB, 2011). They are used predominantly as intermediates in the production of polyurethanes, dyes, rubber, plastics, toluidines, toluenediisocyanates, flexible and rigid foams, surface coatings, and other organic chemicals (ATSDR, 1998; HSDB, 2011). The DNTs are also used as gelatinizing and waterproofing agents in the production of explosives. The DNTs may appear in environmental media as break down products of 2,4,6-trinitrotoluene (TNT). Isomers include 2,3-, 2,4-, 2,5-, 2,6-, 3,4- and 3,5-DNT. Analysis of technical grade DNT yielded the following results: 76.49 percent 2,4-DNT, 18.83 percent 2,6-DNT, 0.65 percent 2,5-DNT, 2.43 percent 3,4-DNT, 1.54 percent 2,3-DNT, 0.040 percent 3,5-DNT, 0.050 percent trinitrotoluene, 0.005 percent cresols, 0.003 percent mononitrobenzene, and 0.003 percent, 0.0005 percent, and 0.006 percent ortho-, meta-, and para-, mononitrotoluenes, respectively. The compounds of most interest in environmental exposure are limited to 2,4- and 2,6-DNT. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
2,3-Dinitrotoluene (602-01-7)										
182.14[a]	2.2[a]	9.3E-8[a] (25°C)[b]	2.57[a]	5.91E-2[c] (25°C)[b]	6.85E-6[c] (25°C)[b]	5.26E-7[a] (25°C)	2.2E+2[d] (25°C)[b]	ND	ND	ND
2,4-Dinitrotoluene (121-14-2)										
182.1[e]	1.98[e]	8.40E-8[l] (25°C)	1.98[e]	2.03E-1[f] (25°C)	7.06E-6[f] (25°C)	1.93E-7[a] (22°C)	2.70E+2[f] (20-25°C)	590.0[g]	814.0[g]	1.35E+4[g]
2,5-Dinitrotoluene (619-15-8)										
182.14[a]	2.2[a]	9.3E-8[a] (25°C)[b]	2.56[a]	5.91E-2[c] (25°C)[b]	6.85E-6[c] (25°C)[b]	5.26E-7[a] (25°C)	2.2E+2[d] (25°C)[b]	ND	ND	ND
2,6-Dinitrotoluene (606-20-2)										
182.1[e]	1.72[e]	7.47E-8[l] (25°C)[b]	1.72[e]	5.91E-2[c] (25°C)[b]	6.85E-6[c] (25°C)[b]	7.46E-7[a] (25°C)	1.82E+2[h] (20-25°C)	558.0[g]	770.0[g]	1.29E+4[g]
3,4-Dinitrotoluene (610-39-9)										
182.14[a]	2.08[a]	9.3E-8[a] (25°C)[b]	2.56[a]	5.91E-2[c] (25°C)[b]	6.85E-6[c] (25°C)[b]	5.26E-7[a] (25°C)	1.00E+2[a] (25°C)	ND	ND	ND
3,5-Dinitrotoluene (618-85-9)										
182.14[a]	2.2[a]	9.3E-8[a] (25°C)[b]	2.56[a]	5.91E-2[c] (25°C)[b]	6.85E-6[c] (25°C)[b]	2.50E-6[a] (25°C)	ND	ND	ND	ND

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);. $H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); ND = no data.

[a]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.
[b]Assumed.
[c]Calculated as described in Introduction to Toxicity Profiles.
[d]Syracuse Research Corporation (SRC), 2004, *CHEMFATE Data Base*, on line.
[e]U.S. Environmental Protection Agency (EPA), 2004 *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim*, Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP July.
[f]U.S. Environmental Protection Agency (EPA), 2002, *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*, Final, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$

[g]U.S. Environmental Protection Agency (EPA), 2003, *Users Guide for Evaluating Subsurface Vapor Intrusion into Buildings*, Office of Emergency and Remedial Response, Washington, D.C., 19 June.
[h]U.S. Environmental Protection Agency (EPA), 1996, *Soil Screening Guidance: Technical Background Document*, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/R-95/128, Publication 9355.4-17A, PB96-963502, May.
[i]U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*.

The physical properties of 2,4-DNT can be used for the DNT mixture (25321-14-6) because the 2,4-isomer predominates in the technical grade product.

2.0 Environmental Fate and Transport

The DNTs are released into the environment in waste streams from processes in which they are manufactured or used (ATSDR, 1998; HSDB, 2011). Also, they may form from degradation of TNT in gunpowder or explosives, particularly at TNT manufacturing or military sites. DNTs released to soil are expected to exhibit moderate mobility and may leach to groundwater. No information on biodegradation in soil was found; however, biodegradation may be an important fate process in soil based on the observation that all DNT isomers in surface water to which yeast extract was added were metabolized. DNTs are not expected to hydrolyze in soils.

DNTs released to water, may exhibit weak to moderate adsorption to sediment (ATSDR, 1998; HSDB, 2011). Evaporation from water is not expected to be an important removal process, based on the low Henry's Law constants for these compounds. Biodegradation may be an important fate process in water, as indicated above. DNTs in water may be susceptible to photolysis, based on the behavior of 2,4-DNT, which had photolytic half-lives ranging from 2.7 to 9.6 hours in natural water environments and 43 hours in distilled water.

DNTs released to the atmosphere are expected to exist solely in the vapor phase (HSDB, 2011). They may be susceptible to direct and indirect photolysis. The half-life for reaction with photochemically produced hydroxyl radicals is 84 days.

Bioconcentration of the DNTs is expected to be negligible (ATSDR, 1998; EPA, 1995; HSDB, 2011); therefore, biotransfer factors are not estimated.

3.0 Toxicokinetics

The rapid disappearance of radioactivity from the small intestine of rats following oral administration of radiolabeled 2,4- or 2,6-DNT suggests that absorption from the GI tract is rapid and essentially complete (ATSDR, 1998; EPA, 1992). Species differences in the excretion of the DNTs, however, confound quantification of the extent of GI absorption. Fecal excretion and the GI tract (tissue + contents) accounted for 9.2 to 17.3 percent of the dose of radioactivity 24 hours after oral administration of radiolabeled 2,4-DNT to rats, rabbits, dogs and monkeys (EPA, 1992). Fecal excretion and the GI tract accounted for 83.1 to 85 percent of an oral dose in mice in the same study. Biliary excretion appears to be more important in mice than in the other species tested. Together, the data for the 2,4-isomer suggest that the GI absorption of the DNTs is practically complete.

Body distribution of radioactivity was followed after administration of a ^{14}C-labeled oral dose of 2,4-DNT in male and female rats (ATSDR, 1998). Levels of radioactivity in the liver and kidneys exceeded levels in the plasma or erythrocytes by 5- to 10-fold; levels in other tissues

were lower than those in blood. The greater concentrations in the liver and kidneys probably represent metabolites rather than parent compound.

Metabolism of the DNTs involves both oxidative and reductive reactions as well as alkylation (ATSDR, 1998). Oxidative reactions occur primarily in the liver and involve stepwise enzymatic oxidation of the methyl group to the corresponding dinitrobenzyl alcohol, dinitrobenzylaldehyde and dinitrobenzoic acid. Dinitrobenzyl alcohol is subject to conjugation, particularly with gluconuric acid, before excretion via the urine or bile. Acetylation of one of the nitro groups of the dinitrobenzoic acid may also occur, yielding the corresponding (n-acetyl)amino nitrobenzoic acid, which is observed as a minor urinary metabolite.

Two types of reduction reactions involving metabolites excreted via the bile or GI tract are accomplished anaerobically by intestinal microflora (ATSDR, 1998). The first reaction involves lysis of the glucuronide conjugate described above to release the corresponding benzyl alcohol. The second reaction involves nitroreduction, resulting in transforming one or both of the nitro groups to amine groups, probably through nitroso and hydroxylamino intermediates. The amino and hydroxylamino benzyl alcohols are reabsorbed, completing the enterohepatic cycle.

The amine group on the reabsorbed benzyl alcohol is subject to partial oxidation in the liver to yield the corresponding hydroxylamino compound, potentially providing a second pathway for formation of these compounds (ATSDR, 1998). The hydroxylamino compounds may conjugate with sulfate, forming an unstable product that decomposes to yield carbonium or nitrenium ions that bond covalently with hepatic macromolecules, giving rise to the first stages of hepatic carcinogenesis. From the foregoing, it appears that microbial transformation and hepatic recirculation are involved in the carcinogenicity observed in laboratory rodents (Section 6.0).

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for the DNTs and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Urinary excretion data obtained from workers exposed to the DNTs indicates that dermal absorption occurs (ATSDR, 1998) but multiple exposure routes were involved and the extent of dermal uptake cannot be quantified. Empirical data regarding dermal uptake from soil were not located. Lacking empirical data, the EPA (2004) default ABS of 0.1 for SVOCs is adopted for the DNTs for this evaluation. t*, K_p, τ, FA and B values are provided by EPA (2004) or estimated by the EPA (2004) methods as follows:

Chemical	t*	K_p	τ	FA	B
2,3-Dinitrotoluene[a]	2.64	4.29E-3	1.10	1	0.0
2,4-Dinitrotoluene[b]	2.69	3.1E-3	1.12	1	0.0
2,5-Dinitrotoluene[a]	2.64	4.29E-3	1.10	1	0.0
2,6-Dinitrotoluene[b]	2.69	2.1E-3	1.12	1	0.0
3,4-Dinitrotoluene[a]	2.64	3.57E-3	1.10	1	0.0
3,5-Dinitrotoluene[a]	2.64	4.84E-3	1.10	1	0.0
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability					

Chemical	t*	K_p	τ	FA	B
coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless). [a]Estimated as described in Introduction to Toxicity Profiles. [b]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP, July.					

The estimated values for K_p for all the DNTs fell within the effective prediction domain.

5.0 Noncancer Effects Evaluation

Data regarding the toxicity of oral exposure to 2,3-DNT are limited to the statement that the 2,4-, 2,6- and 3,4-isomers are more toxic to rats than the 2,3- or 2,5-isomers (HSDB, 2011).

Acute oral exposure to 2,4-DNT induces methemoglobinemia; dogs appear to be more sensitive than rats, which are more sensitive than mice (ATSDR, 1998). Oral LD_{50} values include 270 mg/kg for rats, 1630 mg/kg for mice and 1300 mg/kg for guinea pigs (ATSDR, 1998; HSDB, 2011), establishing the rat as the species most sensitive to acute oral exposure. Subchronic or chronic oral exposure to 2,4-DNT in rats is associated with depressed weight gain, reticulocytosis and splenic hemosiderosis, and decreased spermatogenesis (HSDB, 2011). Some rats had widespread and stiff-legged gaits and demyelination in the cerebellum and brain stem. A verified chronic oral RfD of 2E-3 mg/kg-day for 2,4-DNT is based on neurotoxicity, hematologic effects and biliary tract hyperplasia in dogs given capsules containing the test substance for 2 years (EPA, 2011). Progressive paralysis, accompanied by degenerative lesions in the central nervous system, were observed in dogs treated with 10 mg/kg-day. Hematologic effects, including methemoglobinemia and its sequelae, were observed in dogs treated with 1.5 mg/kg-day, which is the LOAEL for this study. No adverse effects were observed in dogs treated with 0.2 mg/kg-day. Application of an uncertainty factor of 100 to the NOAEL of 0.2 mg/kg-day yields an RfD of 2E-3 mg/kg-day. Confidence in the RfD is high. The CNS, erythrocyte and liver appear to be the target organs for prolonged oral exposure, at least in dogs. EPA (1997) adopted the verified chronic oral RfD as the preliminary RfD for subchronic oral exposure.

HSDB (2011) reports oral LD_{50} values for 2,5-DNT of 707 mg/kg for rats and 1231 mg/kg for mice. Data regarding the effects of prolonged oral exposure were not reported.

Oral LD_{50} values for 2,6-DNT for rats (177 to 665 mg/kg) are similar to those for mice (621 to 714 mg/kg) (ATSDR, 1998; HSDB, 2011). Dogs, however, appear to be more sensitive than rodents in subchronic studies. A provisional chronic oral RfD of 1E-3 mg/kg-day for 2,6-DNT is based on a 13-week dietary study with 2,6-DNT in dogs (EPA, 1997). The NOAEL in this study was 4 mg/kg-day, somewhat higher than the LOAEL for 2,4-DNT. An uncertainty factor of 3000 was applied. The CNS, erythrocyte, liver and kidney appear to be the target organs for prolonged oral exposure to 2,6-DNT. The oral data in dogs suggest that the 2,6-isomer is somewhat less toxic than the 2,4-isomer for prolonged oral exposure. The oral RfD for the 2,6-isomer, however, is less than the oral RfD for the 2,4-isomer. This apparent contradiction is an artifact of the lesser quality data base for 2,6-DNT and, consequently, the higher uncertainty factor used to derive the RfD for the 2,6-isomer. EPA (1997) derived a provisional subchronic oral RfD of 1E-2 mg/kg-day by applying an uncertainty factor of 300 to the NOAEL of 4 mg/kg-day in the 13-week dog study.

The verified chronic oral RfD of 2E-3 mg/kg-day and the provisional subchronic oral RfD of 2E-3 mg/kg-day for 2,4-DNT can be used for DNT mixtures and the other DNT isomers for which oral exposure data sufficient for RfD derivation are not available. The RfD for 2,4-DNT is chosen over the RfD for the 2,6-isomer because the 2,4-isomer predominates in the technical product and because the RfD for the 2,4-isomer is compromised by much less uncertainty.

Occupational studies indicate that acute exposure to the DNTs produces methemoglobinemia, which causes headache, irritability, dizziness, weakness, nausea, vomiting, dyspnea, drowsiness, unconsciousness and, in extreme cases, death (ACGIH, 1991). Occupational exposure may lead to increased risk of ischemic heart disease, possibly arising from decreased oxygen-carrying capacity of the blood. The data are insufficient to develop inhalation RfCs for the DNT isomers.

6.0 Carcinogenicity Evaluation

Carcinogenicity data for the DNTs are somewhat confusing. Treatment of rats and mice with purified 2,4-DNT generally yields no increased incidence of neoplasia, but treatment with technical grade DNT, 2,4-DNT containing as little as 2 percent 2,6-DNT, or with 2,6-DNT itself generally yields a positive neoplastic response (EPA, 2011). Initiation/promotion tests suggest that 2,6-DNT may be a complete carcinogen and 2,4-DNT may be a promoter.

EPA (2011) classified the 2,4-/2,6-DNT mixture in EPA cancer weight-of-evidence Group B2 (probable human carcinogen) on the basis of multiple tumor types in male and female rats and renal tumors in male mice in several dietary studies. Occupational data provide no evidence of carcinogenicity in humans, but the studies reviewed lack the power to reveal small differences in cancer risk (ACGIH, 1991). EPA (2011) verified an oral SF of 6.8E-1 per mg/kg-day for exposure to the 2,4-/2,6-DNT mixture based on an increased incidence of a variety of tumors in female rats. The test material contained approximately 98 percent 2,4-DNT and 2 percent 2,6-DNT. The B2 classification and the oral SF of 6.8E-1 per mg/kg-day are used in this evaluation for 2,6-DNT and the 2,4-/2,6-DNT mixture. Given the uncertainty about to potential carcinogenicity of the 2,4-isomer alone, and the likelihood that small amounts of the 2,6-isomer may be present, it is deemed prudent to apply the B2 classification and the oral SF of 6.8E-1 per mg/kg-day to the 2,4-isomer as well. The data are insufficient for development of potency factors for inhalation exposure. Data regarding the carcinogenicity of the other DNT isomers were not located.

7.0 Toxicity Summary

Toxicity values for the DNTs are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a, b]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
2,4-Dinitrotoluene										
2E-3	2E-3	E, CNS, L	ND	ND	NA	B2	6.8E-1	ND	ND	ND
2,6-Dinitrotoluene										
1E-2	1E-3	E, CNS, L	ND	ND	NA	B2	6.8E-1	ND	ND	ND
sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per										

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a, b]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi

kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ abbreviations: E = erythrocyte; CNS = central nervous system; L = liver.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.
[b]The cancer evaluation for the 2,4-/2,6-DNT mixture is applied to any DNT mixture containing 2,4- and 2,6-DNT (e.g., the technical grade material) as well as the individual 2,4- and 2,6-isomers.

The oral RfD values for 2,4-DNT should be applied to the technical grade material, any 2,4-/2,6 mixture, and any isomers other than pure 2,6-DNT. The cancer weight-of-evidence group and the verified oral SF for the 2,4-/2,6-DNT mixture should not be applied to isomers other than 2,4- and 2,6-DNT because the potential for the other isomers to cause cancer has not been evaluated.

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 1998, ***Update Toxicological Profile for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene***, U.S. Department of Health and Human Services, Atlanta, Georgia, December, PB/99/122004, December.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, ACGIH, Cincinnati, Ohio, pp. 506-511.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line, accessed 17 February.

U.S. Environmental Protection Agency (EPA), 1992, ***Health Advisory for 2,4- and 2,6-Dinitrotoluene (DNT)***, Health and Ecological Criteria Division, Office of Water, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1995, "Final Water Quality Guidance for the Great Lakes System; Final Rule," (40 CFR 9, 122, 123, 131, and 132), ***Federal Register***, 60(56): 15365-15425.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, NTIS No. PB97-921199.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

2,4,6-TRINITROTOLUENE (TNT) (118-96-7)

1.0 Introduction and Physical Properties

TNT is an SVOC that occurs as a pale yellow solid, crystal or flake at ambient temperatures (HSDB, 2011). It is classified as a high explosive and is used as a military explosive in bombs and grenades (ATSDR, 1995; HSDB, 2011). It has found wide use in filling shells and airborne detonation bombs because it can withstand the shock of ejection from a gun barrel but can be exploded on impact with a detonator mechanism. It is used as a pure compound or combined with other explosive chemicals for military application. Small amounts are used in industrial explosives. Minor applications include use as a chemical intermediate in the manufacture of dyestuffs and photographic chemicals. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
227.13	1.60	2.08E-8 (25°C)	3.20	5.10E-2[a] (25°C)[b]	5.91E-6[a] (25°C)[b]	1.06E-8 (20°C)	5.52E+2 (25°C)	NA	NA	NA

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point of pure liquid compound (°K); T_c = critical temperature (°K); $\Delta H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); NA = not applicable.
Note: All values are from [h]U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*, unless otherwise noted.
[a]Estimated as described in Introduction to Toxicity Profiles.
[b]Assumed.

2.0 Environmental Fate and Transport

TNT may be released to the environment in wastewater and air effluents from its production and use as a military explosive and propellant, and during the disposal or open detonation of outdated or unwanted munitions (ATSDR, 1995; HSDB, 2011). The behavior of TNT in the environment is expected to be controlled largely by its relatively high water solubility and relatively low vapor pressure. In addition, direct and indirect photolysis yields a large number of degradation products, many of which are persistent in environmental media. Photolysis products include dinitroanthrils, trinitrobenzaldehyde, trinitrobenzyl alcohol, various nitroanilines, condensed azo and axoxy derivatives, and 1,3,5-trinitrobenzene.

Although low, the vapor pressure of TNT is sufficient to suggest that the compound will exist largely in the vapor phase in the atmosphere, where it is expected to be subject to photolysis (HSDB, 2011). The photolysis half-life has been estimated at approximately 110 days. The solubility of TNT in water suggests that wet deposition may be a significant removal process.

TNT on the surface of soil is subject to photolysis (ATSDR, 1995; HSDB, 2011). Mobility in soil is expected to be low to moderate. Large quantities released to soil (e.g., from former munitions production works) may result in substantial concentrations in groundwater. TNT in soil is subject to degradation to a number of nitro reduction products (amino compounds, mono- and dinitro compounds).

TNT in surface water is subject to photolysis; volatilization and hydrolysis are not expected to be significant (ATSDR, 1995; HSDB, 2011). Photolysis gives rise to the persistent red or pink water condition frequently observed with TNT contamination. Biodegradation occurs too slowly to be an important removal process. TNT and some of its degradation products will partition moderately to sediment or suspended particles in water.

Bioconcentration or bioaccumulation are not expected to be significant for TNT (ATSDR, 1995; HSDB, 2011); therefore, biotransfer factors are not developed.

3.0 Data for Evaluating Dermal Exposure

Pharmacokinetic data are limited to studies of oral administration of radiolabeled compound to several species followed by collection and measurement of radioactivity in urine, gastrointestinal tract (including contents) and feces (ATSDR, 1995). Total recovery from these compartments ranged from 92 to 104 percent, suggesting little metabolism to radioactive metabolites that were exhaled. The percent of the dose recovered in the urine may be considered a minimal estimate of GI absorption, because the extent of biliary excretion and enterohepatic recirculation has not been investigated. Urinary recovery averaged 60 percent in rats, mice and dogs, and approximately 74 percent in rabbits.

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for TNT and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Studies indicate that TNT is rapidly absorbed through the skin of occupationally exposed humans, but quantitative data were not located (ATSDR, 1995). Dermal absorption ranged from 17 to 68 percent of a single dose of radioactivity in studies using laboratory animals exposed for 24 hours to radiolabeled compound. Absorption appeared to be more complete in rabbits and mice than in rats and dogs, suggesting that species differences are significant. Data were not located regarding the dermal uptake of TNT from soil, which would account for the matrix effect, or the ability of soil to bind the chemical and retard its dermal uptake. An ABS of 0.032 (EPA, 2010) is adopted for this evaluation. K_p, τ, FA and B values are estimated by the EPA (2004) method as follows:

Chemical	K_p	τ	FA	B
2,4,6-Trinitrotoluene	9.64E-4	1.96E+0	1.0[a]	0[b]

K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).
[a]Assumed based on the value used for similar compounds.
[b]Sufficiently small to be rounded to zero.

4.0 Noncancer Effects Evaluation

Single-dose oral LD50 values for TNT include 1010 to 1320 mg/kg for male rats, 795 to 820 mg/kg for female rats, and 660 to 1014 mg/kg in mice (ATSDR, 1995; EPA, 1993; HSDB, 2011). Female rats appear to be slightly more sensitive than males, but no significant gender differences appear in mice. Acutely poisoned animals exhibit tremors and convulsions. The radicals produced during intracellular nitroreduction of TNT inflict damage on several organelles across many different cell and tissue types.

The critical effect of prolonged oral exposure of animals to TNT is liver damage (EPA, 2011). Dogs appear to be more sensitive than rats or mice. A verified RfD for chronic oral exposure of 5E-4 mg/kg-day was derived from a LOAEL of 0.5 mg/kg-day associated with hepatic swelling

and hepatocytomegaly in a 26-week feeding study in dogs. An uncertainty factor of 1000 was applied. The UF of 1000 allows for uncertainties in laboratory animal-to-man dose extrapolation, interindividual sensitivity, subchronic-to-chronic extrapolation, and LOAEL-to-NOAEL extrapolation, although the individual uncertainty factors for each category were not given. Hemosiderosis, evidence of erythrocyte destruction, was observed in dogs treated at a dose rate as low as 2 mg/kg-day (ATSDR, 1995). Confidence in the oral RfD is medium. EPA (1997) adopted the verified chronic oral RfD as the provisional oral RfD for subchronic exposure.

Although the key study is described as a comprehensive and well designed subchronic study, only effects on the liver were reported by EPA (2011), presumably because the liver effects were the critical effects upon which the oral RfD is based. Specifically, observations regarding clinical chemistry, hematology, urinalyses, periodic electrocardiography and ophthalmic examinations were not reported. Additional information from other sources, however, indicates that anemia is one of the major signs of TNT toxicity consistently observed in rats, mice and dogs (ATSDR, 1995). TNT and/or its metabolites induce the oxidation of intracellular hemoglobin to methemoglobin, which results in erythrocytic hemolysis. Hemolytic anemia is followed by a compensatory response manifested primarily as reticulocytosis. Effects on the testes, including irreversible atrophy and decreased reproductive performance, apparently secondary to altered zinc and copper nutrition, are observed in rats treated with much higher dose rates (e.g., 125 mg/kg-day).

Target organs at or near the threshold for toxicity include the erythrocyte and liver. Effects on the erythrocyte arise from the oxidation of hemoglobin to methemoglobin, which is consistently observed with exposure to inorganic nitrates and nitrites, as well as with many other nitroaromatic compounds (HSDB, 2011). Mild effects on the liver occur at slightly lower doses; the mechanism of hepatotoxicity has not been elucidated. Effects on the testes at higher levels probably arise from reduced levels of circulating ceruloplasmin, which is necessary for proper zinc nutrition at the cellular level.

Information regarding the inhalation toxicity of TNT are limited to occupational studies, which probably also include dermal exposure, generally associated with the manufacture of explosives for World War I and World War II (ATSDR, 1995). Effects attributed to occupational exposure include deaths from liver disease and aplastic anemia, anemia, dermatitis and cataracts. The data are insufficient to derive an RfC for inhalation exposure to TNT.

5.0 Carcinogenicity Evaluation

TNT is classified in EPA weight-of-evidence Group C (possible human carcinogen) on the basis of positive mutagenicity studies and dietary studies that showed an increased incidence of urinary bladder tumors in rats (EPA, 2011). Human data are inadequate. An oral SF of 3.0E-2 per mg/kg-day is based on the incidence of bladder tumors in female rats in a 24-month dietary study. The data are inadequate for potency estimation for inhalation exposure.

6.0 Toxicity Summary

Toxicity values for TNT are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
5E-4	5E-4	L, E	ND	ND	NA	C	3.0E-2	C	ND	ND

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per microgram per kilogram-day); ND = no data; NA = not applicable.
Target organ abbreviations: L = liver; E = erythrocyte.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.

7.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 1995, ***Toxicological Profile for 2,4,6-Trinitrotoluene (TNT)***, U.S. Department of Health and Human Services, Atlanta, Georgia, on line.

Hazardous Substance Data Bank (HSDB), 2003, National Library of Medicine, on line.

U.S. Environmental Protection Agency (EPA), 1993, ***Risk Assessment Issue Paper for: Derivation of Oral RfD for 2-Amino-4,6-Dinitrotoluene (CASRN 35572-78-2) and 4-Amino-2,6-Dinitrotoluene (CASRN 19406-51-0) By Analogy to 2,4,6-Trinitrotoluene Systemic Toxicity Assessment***, National Center for Environmental Assessment, Cincinnati, Ohio, 23 February.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, PB97-921199, July.

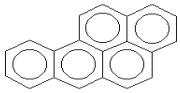
U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim, Final***, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-0SEP, NTIS No. PB99-963312, July.

U.S. Environmental Protection Agency (EPA), 2010, ***Regional Screening Level Table, (November 2010)***, on line at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

Semivolatile Organic Compounds

POLYNUCLEAR AROMATIC HYDROCARBONS a.k.a. POLYCYCLIC AROMATIC HYDROCARBONS a.k.a. POLYAROMATIC HYDROCARBONS (PAH) (130498-29-2)



Benzo(a)Pyrene
(A representative and the most studied member of this class of compounds.)

1.0 Introduction and Physical Properties

The PAHs regularly observed in environmental media and addressed in this profile include acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene. All exist as solids at room temperature. Classification as **SVOC** or **VOC** is made in the following table. PAHs are the products of incomplete combustion of fossil fuels or other organic matter, hence include both natural and anthropogenic sources (ATSDR, 1995a; HSDB, 2011). Several are also components of crude oil. Naphthalene is used in the synthesis of phthalic anhydride, the insecticide carbaryl, leather tanning agents and surface active agents, and is a component of diesel and other fuels (ATSDR, 1995b). Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
Acenaphthene (83-32-9) **(VOC)**										
154.21[a]	3.92[a]	1.55E-4[b] (25°C)	3.85[b]	4.21E-2[b] (25°C)	7.69E-6[b] (25°C)	3.29E-6[a] (25°C)	4.24E+0[b] (20-25°C)	550.54[c]	803.15[c]	1.22E+4[c]
Acenaphthylene (208-96-8) **(VOC)**										
152.20[a]	4.07[a]	1.13E-5[a] (25°C)	3.42[a]	6.67E-2[d] (25°C)[e]	7.72E-6[d] (25°C)[e]	1.20E-6[a] (25°C)	3.93E+0[a] (25°C)	543.2[a]	797[f]	1.1E+4[g]
Anthracene (120-12-7) **VOC)**										
178.23[a]	4.45[a]	6.51E-5[b] (25°C)	4.47[b]	3.24E-2[b] (25°C)	7.74E-6[b] (25°C)	3.51E-9[a] (25°C)	4.34E-2[b] (20-25°C)	615.18[c]	873.00[c]	1.31E+4[c]
Benzo(a)anthracene (56-55-3) **(SVOC)**										
228.3[h]	5.66[h]	3.34E-6[b] (25°C)	5.60[b]	5.10E-2[b] (25°C)	9.00E-6[b] (25°C)	2.50E-9[a] (25°C)	9.40E-3[b] (20-25°C)	708.15[c]	1004.8[c]	1.60E+4[c]
Benzo(a)pyrene (50-32-8) **(SVOC)**										
252.3[a]	6.10[h]	4.57E-7[k] (25°C)	6.01[b]	4.30E-2[b] (25°C)	9.00E-6[b] (25°C)	7.22E-12[a] (25°C)	1.62E-3[b] (20-25°C)	715.90[c]	969.27[c]	1.90+4[c]
Benzo(b)fluoranthene (205-99-2) **(VOC)**										
252.3[h]	6.12[h]	6.57E-7[k] (25°C)	6.09[b]	2.26E-2[b] (25°C)	5.56E-6[b] (25°C)	6.58E-10[a] (20°C)	1.50E-3[b] (20-25°C)	715.90[c]	969.27[c]	1.70+4[c]
Benzo(k)fluoranthene (207-08-9) **(SVOC)**										
252.32[a]	6.84[a]	8.29E-7[b] (25°C)	6.09[b]	2.26E-2[b] (25°C)	5.56E-6[b] (25°C)	1.28E-12[a] (25°C)	8.00E-4[b] (20-25°C)	753.15[c]	1019.7[c]	1.80E+4[c]
Benzo(g,h,i)perylene (191-24-2) **(SVOC)**										
276.34[a]	6.63[a]	2.66E-7[a] (20°C)	4.98[a]	4.48E-2[d] (25°C)[e]	5.19E-6[d] (25°C)[e]	1.3E-13[a] (25°C)	2.6E-4[a] (25°C)	823[a]	1097[f]	1.96E+4[g]
Chrysene (218-01-9) **(VOC)**										
228.3[h]	5.66[h]	9.46E-5[b] (25°C)	5.60[b]	2.48E-2[b] (25°C)	6.21E-6[b] (25°C)	8.20E-12[a] (25°C)	1.60E-3[b] (20-25°C)	714.15[c]	979.0[c]	1.65E+4[c]
Dibenz(a,h)anthracene (53-70-3) **(SVOC)**										
278.4[h]	6.84[h]	1.47E-8[b] (25°C)	6.58[b]	2.02E-2[b] (25°C)	5.18E-6[b] (25°C)	1.32E-13[a] (20°C)	2.49E-3[b] (20-25°C)	743.24[c]	990.41[c]	3.00E+4[c]
Fluoranthene (206-44-0) **(VOC)**										
202.3[h]	4.95[h]	1.61E-5[b] (25°C)	5.03[b]	3.02E-2[b] (25°C)	6.35E-6[b] (25°C)	1.21E-8[a] (25°C)	2.06E-1[b] (20-25°C)	655.95[c]	905.0[c]	1.38E+4[c]

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
Fluorene (86-73-7) **(VOC)**										
166.21[a]	4.18[i]	6.37E-5[b] (25°C)	4.14[b]	3.63E-2[b] (25°C)	7.88E-6[b] (25°C)	4.21E-7[a] (20°C)	1.98E+0[b] (20-25°C)	570.44[c]	870.0[c]	1.27E+4[c]
Indeno(1,2,3-cd)pyrene (193-39-5) **(SVOC)**										
276.3[h]	6.58[h]	1.60E-6[b] (25°C)	6.54[b]	1.90E-2[b] (25°C)	5.66E-6[b] (25°C)	1.71E-13[a] (25°C)	2.20E-5[b] (20-25°C)	809.15[c]	1078.2[c]	1.90E+4[c]
Naphthalene (91-20-3) **(VOC)**										
128.2[h]	3.30[h]	4.40E-4[k] (25°C)	3.30[b]	5.90E-2[b] (25°C)	7.50E-6[b] (25°C)	1.12E-4[a] (25°C)	3.10E+1[b] (20-25°C)	491.14[c]	748.40[c]	1.04E+4[c]
Phenanthrene (85-01-8) **(VOC)**										
178.2[h]	4.46[h]	1.24E-4[a] (25°C)	4.36[a]	6.00E-2[d] (25°C)[e]	6.95E-6[d] (25°C)[e]	8.95E-7[a] (25°C)	1.29E+0[a] (25°C)	613.2[a]	869.2[j]	1.42E+4[a]
Pyrene (129-00-0) **(VOC)**										
202.26[a]	4.88[a]	1.1E-5[b] (25°C)	5.02[b]	2.72E-2[b] (25°C)	7.24E-6[b] (25°C)	1.17E-7[a] (25°C)	1.35E-1[b] (20-25°C)	667.95[c]	936.0[c]	1.44E+4[c]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);.$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); ND = no data.

[a]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line, accessed 23 April.

[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

[c]U.S. Environmental Protection Agency (EPA), 2000, ***User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings, Revised***, Office of Emergency and Remedial Response, Washington, D.C., December.

[d]Calculated as described in Introduction to Toxicological profiles.

[e]Assumed.

[f]Estimated from Equation 12-4 in Lyman, W.J., W.F. Reehl and D.H. Rosenblatt, 1990, ***Handbook of Chemical Property Estimation Methods***, American Chemical Society, Washington, D.C..

[g]Estimated from Equation 13-5 in Lyman, W.J., W.F. Reehl and D.H. Rosenblatt, 1990, ***Handbook of Chemical Property Estimation Methods***, American Chemical Society, Washington, D.C..

[h]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

[i]Syracuse Research Corporation (SRC), 2004, ***CHEMFATE Search Results***, on line, accessed 23 April.

[j]National Institute of Standards and Technology (NIST), 2004, Standard Reference Data Program, Online Data Bases, accessed 23 April.

[k]U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*.

2.0 Environmental Fate and Transport

The PAHs are ubiquitous products of incomplete combustion; natural sources include volcanoes and forest fires (ATSDR, 1995a, b; HSDB, 2011). There is some evidence for biosynthesis by plants, bacteria and algae. Some of the PAHs occur naturally in fossil fuels. Anthropogenic releases to the environment, primarily to the atmosphere, greatly outweigh the natural sources and include any processes that involve incomplete combustion of fossil fuels and organic matter, including wood-burning for home heat (the predominant source), cigarette smoke, internal combustion engine exhaust, and fuel oil emissions. Industrial sources include coal mining, processing and storing, wood treatment (creosote), manufactured gas plants (coal tar), power generation, production of coal tar, coke and asphalt, petroleum cracking and industrial and municipal incineration. Other sources include various crude oils, fresh and used motor oils, gasolines, charcoal-broiled foods, processed foods, various oils, margarine, butter and fats, fruits, vegetables, and cereals, roasted coffee and tea. Indoor sources include unvented kerosene heaters and gas cooking and heating appliances. Naphthalene is released during its manufacture and processes that involve its use (e.g., vaporization from moth balls).

Although PAHs generally occur in mixtures, certain chemicals tend to predominate in different sources so that the PAH pattern observed in a given medium may provide a clue to the source. The following compilation relates individual PAHs and sources:

Source[a]	Individual PAHs
Residential wood burning	Acenaphthylene
Auto emissions	Benzo(g,h,i)perylene, pyrene
Diesel exhaust particulates	Fluoranthene, phenanthrene, pyrene
Diesel exhaust vapors	Phenanthrene, anthracene

Source[a]	Individual PAHs
Diesel total emissions	Acenaphthene, fluorene, phenanthrene
Fly ash & bottom ash from U.S. municipal waste incinerators	Phenanthrene
Fly ash from U.K. municipal waste incinerators	Benzo(g,h,i)perylene
Particulate emissions from municipal waste incinerator	Benzo(a)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene
Municipal/medical waste incinerator	Benzo(a)anthracene, benzo(g,h,i)perylene
Rotary kiln incinerator charged with polyethylene, no afterburner	Fluoranthene, phenanthrene, pyrene (see next entry)
Rotary kiln incinerator charged with polyethylene with afterburner	Benzo(a)anthracene, phenanthrene (total PAH emissions reduced 100-fold compared with no afterburner)
Coal tar pitch emissions	Phenanthrene and pyrene 20 to 80 X > benzo(a)pyrene, benzo(g,h,i)perylene
Natural gas home appliances – fine particulate emissions	Chrysene, fluoranthene, pyrene, triphenylene
Groundwater near coal & oil gasification plant	Acenaphthylene, acenaphthene, fluorene, phenanthrene, fluoranthene, pyrene, chrysene
Groundwater near wood treatment facilities	Benzo(a)pyrene, phenanthrene
[a]Agency for Toxic Substances and Disease Registry, (ATSDR), 1995, ***Update Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)***, U.S. Public Health Service, Atlanta, Georgia, August, on line.	

Data compiled for soils are not included in the table above because the lists are long and the variation from one site to another is great, so that the information is not useful for identifying sources. Similarly, sediment is a sink for PAHs from all sources including atmospheric deposition from far distant locations, and the patterns observed in sediment do not necessarily reflect a nearby source (ATSDR, 1995a). Generally, PAHs associated with combustion exhibit highly condensed ring structures and little alkylation (i.e., benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, benzo(e)pyrene, chrysene, fluoranthene, pyrene).

Crude petroleum and products made from crude petroleum (e.g., asphalts, fuels, oils) contain PAHs, but the patterns observed depend on the location of the source (ATSDR, 1995a; Potter and Simmons, 1998). Phenanthrene and alkylated forms of PAHs, particularly the methylnaphthalenes, often predominate in petroleum products.

The partitioning and fate of the PAHs in environmental media depend largely on VP (tendency to exist in air as a vapor), H (indicator of partitioning between air and water) and K_{oc} (indicator of affinity to bind to organic matter in soil and sediment). ATSDR (1995a) noted that H and K_{oc} are roughly directly related to MW, and that VP is roughly inversely related to MW. Therefore, they grouped the PAHs into the following categories to facilitate understanding their behavior in the environment:

- Low MW (152 to 178 g/mole) – acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, phenanthrene

- Medium MW (approximately 202 g/mole) – fluoranthene, pyrene

- High MW (228 to 278 g/mole) – benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.

PAHs exist in the atmosphere as vapors or adsorbed to particulates, the proportion depending on the vapor pressure of the individual chemical and atmospheric conditions such as temperature and humidity (ATSDR, 1995a, b; HSDB, 2011). Generally, the two- and three-ring compounds (low and medium MW except pyrene) exist predominantly as vapors; the four-ring compounds exist in both the vapor and particulate phase, and compounds with 5 or more rings (benzo[a]pyrene, benzo[g,h,i]perylene exist predominantly as particulates. Increasing atmospheric temperature and relative humidity favors existence in the vapor phase. PAHs may travel short or long distances before removal from the air. Vapor forms are subject to chemical oxidation processes in the air, which reduces the distance they may travel. Residence time and transport distance is inversely related to the size of the particles on which the PAHs are adsorbed. Small particles may have residence times of weeks, permitting transport for hundreds or upwards of a thousand miles. Wet and dry deposition accounts for removal of the particulates.

The predominant sources of PAHs in surface water are deposition from the atmosphere, industrial and sewage effluent and oil spills (ATSDR, 1995a, b). Runoff and erosion can also contribute PAHs to surface water bodies. Volatilization is a significant fate process for PAHs with H values of 1E-5 atm-m^3/mole or greater (generally the low and medium MW compounds). Volatilization is a very limited removal process for most of the high MW compounds. Volatilization is enhanced by high temperature, turbulence and high wind. Sorption to benthic or suspended sediment and biodegradation are competing removal processes. Generally, volatilization and biodegradation are the predominant removal processes for the low MW compounds, and volatilization and sorption are the predominant removal processes for medium and high MW compounds. Naphthalene is relatively water soluble and may remain largely in solution. PAHs in sediment may biodegrade, recycle back to the water column (lower MW compounds) or accumulate in the lower trophic levels of living organisms.

Deposition from the atmosphere is the principal source of PAHs in soil (ATSDR, 1995a, b). Other sources include industrial activities, disposal of sewage sludge, and leaching from coal storage sites. Most PAHs sorb to soil constituents because of their low solubility and high affinity for organic matter. Volatilization is an important removal process for the low molecular weight compounds. Some of the low molecular weight compounds, particularly naphthalene, may leach fairly rapidly to groundwater.

The high lipophilicity of many PAHs evidenced by high log K_{ow} values suggest that the PAHs might cross biologic membranes and participate significantly in food-chain pathways involving fish, fruit and vegetable, and meat and milk consumption. This, however, is not the case. For example, the PAHs are efficiently metabolized and excreted by fin fish, greatly reducing the likelihood of bioconcentration from water or bioaccumulation from sediment (ATSDR, 1995a). Consequently, there are often great discrepancies between modeled BCF values and empirical BCF values, where care was taken to identify the parent compound rather than PAH metabolites in fish tissue. This distinction is necessary because aromatic fragments from PAH metabolism are readily assimilated as normal endogenous components of biological tissue. PAH concentrations in aquatic food-chain systems usually decrease with increasing trophic level, reflecting the generally greater efficiency of metabolism in the higher trophic organisms.

Approximate tissue-to-sediment PAH concentration ratios were reported to be 0.6 to 1.2 for amphipods, 0.1 for clams, and 0.05 for fin fish and shrimp.

It has been reported that terrestrial plants can accumulate PAHs from soil by uptake through the roots (ATSDR, 1995a). More careful investigation, however, reveals that root uptake is quite low, and there is no evidence of bioconcentration or biomagnification. For example, PAH ratios in vegetation to soil in one survey ranged from 0.001 to 0.18 for total PAHs, and from 0.002 to 0.33 for benzo(a)pyrene. It is likely that most of the PAH contamination on the vegetation resulted from atmospheric deposition. Increased concentrations in vegetation have not been observed when soil PAH concentrations were greatly increased by amendment with sewage sludge. Data from carrots (*Daucus carotu*) showed that PAHs adhere to the outer skin of the root but show little tendency to penetrate to deeper layers, and even less tendency to translocate to aerial parts.

The inability of plants to bioconcentrate PAHs from soil reduces concern for bioconcentration in agricultural products such as meat and milk. It should be noted, however, that measurable concentrations of PAHs may accumulate on the aerial parts of plants because of deposition from the atmosphere (ATSDR, 1995a). Also, food-producing animals ingest a substantial amount of soil while grazing or consuming mechanically harvested forage crops. Mammals, however, efficiently metabolize the PAHs to polar compounds that are readily excreted, reducing concern for bioconcentration.

In summary, the PAHs are highly lipophilic, which implies significance in food-chain exposure pathways. Empirical data, however, show that fish and mammals efficiently metabolize and eliminate these compounds. Furthermore, bioconcentration in plants because of uptake from soil is not significant. Therefore, it is unlikely that the PAHs would participate significantly in food-chain pathways, and biotransfer factors are not estimated.

3.0 Toxicokinetics

The PAHs are absorbed by all routes of exposure, but the rate and extent depends on the compound, the species of animal and the vehicle (or nature of the particulates) (ATSDR, 1995a). PAHs are readily absorbed during inhalation exposure; however, intratracheal instillation studies indicate that particle size is the most important determiner of the extent of pulmonary uptake.

Toxicokinetic studies of several PAHs summarized by ATSDR (1995a) provide limited quantitative information regarding the extent of GI absorption. Limitations arise largely because biliary excretion complicates quantification of uptake from the GI tract. A study of benzo(a)pyrene in rats suggests that GI absorption ranges from 38 to 58 percent. A study in rats reported absorption efficiency for anthracene ranging from 53 to 74 percent. GI absorption of pyrene, chrysene and dibenzo(a,h)anthracene is described as high. Administration of the test compound in oil or in a high-fat diet appears to increase the extent of GI absorption.

Empirical data with pure compound dissolved or suspended in various vehicles suggest that dermal uptake of benzo(a)pyrene is extensive (ATSDR, 1995a). One occupational study reported that approximately 75 percent of systemically absorbed pyrene entered the body through dermal uptake rather than through inhalation exposure. Combining PAHs with soil appears to significantly reduce the extent of dermal uptake compared with oleaginous or acetone vehicles.

Anecdotal evidence from using cloth diapers stored in contact with naphthalene indicates that naphthalene is absorbed by the skin, but quantitative data are not available (ATSDR, 1995b).

Distribution of absorbed PAHs is generally widespread, with highest levels located initially in lipid-rich tissues (ATSDR, 1995a). Highest levels of metabolites (radioactivity following administration of radiolabeled compounds) are located in the liver and GI tract, even after inhalation exposure, probably reflecting extensive metabolism in the liver followed by biliary excretion. Ciliary clearance and deglutition probably contribute to levels associated with the GI tract. Concentrations of radioactivity following administration of radiolabeled compound reveal fetal levels approximately 2- to 10-fold lower than maternal levels, although this depends on the specific compound administered.

Metabolism of the PAHs, particularly benzo(a)pyrene, has been extensively studied (ATSDR, 1995a). Metabolism proceeds rapidly, yielding products that are more water soluble and readily excreted than the parent compound. All tissues have the ability to metabolize the PAHs, potentially to carcinogenic intermediates, which probably accounts for the observation that cancers occur at the point of contact. There is considerable variability in tissue metabolic activity; however, the liver is probably the most active in most cases.

ATSDR (1995a) distinguishes between “alternant” and “nonalternant” PAHs, based on the nature of the electron density associated with the molecule, which influences how that compound is metabolized to its ultimate carcinogen. Alternant PAHs (e.g., benzo[a]pyrene, benzo[a]anthracene, chrysene, dibenz[a,h]anthracene) exhibit a uniformly distributed electron density. Nonalternant PAHs (e.g., fluoranthene, benzo[k]fluoranthene, indeno[1,2,3-cd]pyrene) behave more like two separate molecules because of uneven electron distribution.

Alternant PAHs (based on data for benzo[a]pyrene) are initially metabolized by the microsomal cytochrome P-450 system to several arene oxides (ATSDR, 1995a). These may re-arrange spontaneously to phenols or undergo hydration to form the corresponding trans-dihydrodiols. Further oxidation of the dihydrodiols results in formation of quinones, phenol diols and dihydrodiol epoxides. Phenols may be formed by direct insertion of oxygen into a ring. Many of the metabolites resulting from the reactions described above are subject to conjugation with various substrates followed rapidly by excretion. The dihydrodiol epoxides that form in the “bay” region (the three-sided concave region formed by the fusion of three benzene rings) are most likely the ultimate carcinogens that covalently bind to macromolecules such as DNA, resulting in alkylation or other adducts that yield genetic errors.

Metabolism of the nonalternant PAHs differs from the alternant PAHs in that more extensive oxidation to hydroxy-epoxy-diols may be important to achieve genotoxicity (ATSDR, 1995a). Dihydrodiol epoxide formation in the bay region is associated with carcinogenicity of the PAHs generally; however, some of the nonalternant PAHs yield reactive metabolites that deviate from the classical bay region model.

PAH metabolites are readily excreted, largely through the bile, although some metabolites are excreted by the kidney (ATSDR, 1995a). The extent of elimination is species specific. In one inhalation study rats excreted metabolites much more efficiently than dogs or monkeys.

4.0 Dermal Exposure

EPA (2004) recommends that oral toxicity values for the PAHs should not be adjusted when applied to dermal exposure because GI absorption probably exceeds 50 percent. Therefore, no GAF is estimated and the oral toxicity values described below should be used for dermal exposure without adjustment.

Empirical data with pure compound dissolved or suspended in various vehicles suggest that dermal uptake of benzo(a)pyrene is extensive (ATSDR, 1995a). Anecdotal evidence from using cloth diapers stored in contact with naphthalene indicates that naphthalene is absorbed by the skin, but quantitative data are not available (ATSDR, 1995b). EPA (2004) reviewed empirical data regarding dermal uptake of benzo(a)pyrene and recommended an ABS of 0.13 for the PAHs. However, EPA (2004) also notes that VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels. Therefore, the ABS of 0.13 is applied to all the PAHs identified above as SVOCs. Dermal uptake of the PAHs identified as VOCs is not quantified.

Values for t*, K_p, τ, FA and B are provided or estimated as follows:

Chemical	t*	K_p	τ	FA	B
Acenaphthene[a]	1.84	8.39E-2	7.67E-1	1	0.4
Acenaphthylene[a]	1.79	1.08E-1	7.47E-1	1	0.5
Anthracene[a]	4.06	1.38E-1	1.05E+0	1	0.7
Benzo(a)anthracene[b]	8.53	4.7E-1	2.03E+0	1.0	2.8
Benzo(a)pyrene[b]	11.67	7.0E-1	2.69E+0	1.0	4.3
Benzo(b)fluoranthene[b]	12.03	7.0E-1	2.77E+0	1.0	4.3
Benzo(k)fluoranthene[a]	12.40	2.00E+0	2.72E+0	0.4	12
Benzo(g,h,i)perylene[a]	8.89	1.07E+0	3.70E+0	0.7	6.8
Chrysene[b]	8.53	4.7E-1	2.03E+0	1.0	2.8
Dibenz(a,h)anthracene[b]	17.57	1.5E+0	3.88E+0	0.6	9.7
Fluoranthene[b]	5.68	2.2E-1	1.45E+0	1.0	1.2
Fluorene[a]	2.15	1.07E-1	8.95E-1	1	0.5
Indeno(1,2,3-cd)pyrene[b]	16.83	1.0E+0	3.78E+0	0.6	6.7
Naphthalene[b]	1.34	4.7E-2	5.6E-1	1	0.2
Phenanthrene[b]	4.11	1.4E-1	1.06E+0	1	0.7
Pyrene[a]	3.42	1.94E-1	1.43E+0	1	1.1

t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).
[a]Estimated as described in Introduction to Toxicological profiles.
[b]Provided by U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

5.0 Noncancer Effects Evaluation

The PAHs are generally divided into two EPA cancer weight-of-evidence groups: Group D – not classifiable as to carcinogenicity to humans, and Group B2 – probable human carcinogens. The Group D PAHs have not been evaluated for carcinogenicity by toxicity testing; therefore, cancer SFs or URFs cannot be estimated for these compounds (EPA, 1986, 2011). Risk evaluation of these compounds is limited to noncancer effects. It is theoretically possible that cancer risk could be the "driver" for some of these compounds. However, the mechanism of carcinogenicity of the PAHs is fairly well understood to be correlated with molecular

morphology and the propensity to form certain active metabolites (ATSDR, 1995a). The Group D PAHs either do not fit the morphologic mold or have been shown empirically to be unlikely to cause cancer, reducing greatly the uncertainty that significant cancer risk is being overlooked.

Cancer SFs and URFs are available for the Group B2 compounds, but noncancer RfDs or RfCs are not. Therefore, risk evaluation of these compounds is limited to cancer risk. These compounds have the morphologic requirements for carcinogenicity; therefore, it has been thought that cancer risk is the driver, and that noncancer effects are relatively insignificant, although empirical data were lacking until recently.

Recent data support this assumption. De Jong et al. (2008) reported a study in which male rats were treated by gavage with benzo(a)pyrene 5 days per week for 35 days at dose rates of 0 (control), 3, 10, 30 or 90 mg/kg. Significantly reduced rate of body weight gain and altered organ weights were observed in the 90 mg/kg group. Fore stomach lesions were found in the 30 and 90 mg/kg groups. Decreased thymus weights and hematological evidence of erythrocyte toxicity were observed in a dose-related manner in rats treated with 10 mg/kg and above. Subtle alterations in measures of immune function were also observed in these groups, establishing 10 mg/kg as the LOAEL and 3 mg/kg as the NOAEL for this study. The 3 mg/kg dose is equivalent to a NOAEL of 2.1 mg/kg-day when adjusted for continuous exposure. Application of an uncertainty factor of 1000 (factor of 10 to expand from subchronic to chronic exposure, and factors of 10 each to provide additional protection for intra- and interspecies variation) allows development of a preliminary oral RfD of 2E-3 mg/kg-day. Uncertainty surrounding the preliminary oral RfD is very high because the data base for the noncancer effects of benzo(a)pyrene is essentially limited to one study and several toxicological endpoints (e.g., developmental, reproductive, neurological) were not investigated.

The sole purpose for developing this oral RfD is to evaluate the potential for noncancer effects to be the driver for the Group B2 PAHs. The RfD was not developed with sufficient rigor to be used in the risk assessment of the noncancer effects of benzo(a)pyrene. The oral SF for benzo(a)pyrene is 7.3 per mg/kg-day (please see below), from which it is estimated that the oral RfD is equivalent to a cancer risk of 1.5E-2. This cancer risk is orders of magnitude above the EPA (1990) risk management range of 1E-6 to 1E-4, strengthening the position that noncancer effects are unlikely to be the driver for the Group B2 PAHs.

Data regarding the toxicity of acute oral exposure to the PAHs are generally scarce. Prolonged oral exposure to the Group D PAHs is associated with a number of renal, hematologic and other effects, depending on the compound.

Subchronic (90 day) gavage treatment of mice with acenaphthene is associated with histopathologic evidence of liver hypertrophy. A verified RfD of 6E-2 mg/kg-day for chronic oral exposure was derived from the NOAEL of 175 mg/kg-day and an uncertainty factor of 3000 (EPA, 2011). The LOAEL in this study was 350 mg/kg-day. Confidence in the RfD is low. The liver is considered the target organ for prolonged oral exposure to acenaphthene. EPA (1997) derived a provisional subchronic oral RfD for acenaphthene of 6E-1 mg/kg-day from the same mouse study using an uncertainty factor of 300.

A verified RfD of 3E-1 mg/kg-day for chronic oral exposure to anthracene was derived from a NOEL of 1000 mg/kg-day, the highest dose tested, in a 90-day gavage study in mice (EPA,

2011). An uncertainty factor of 3000 was applied. Confidence in the RfD is low. The data are inadequate to identify a target organ for prolonged oral exposure to anthracene. EPA (1997) derived a provisional subchronic oral RfD for anthracene of 3E+0 mg/kg-day from the same mouse study using an uncertainty factor of 300.

Subchronic exposure to fluoranthene induces liver and kidney effects and hematologic alterations in orally treated mice (EPA, 2011). A verified RfD of 4E-2 mg/kg-day for chronic oral exposure was derived from a NOAEL of 125 mg/kg-day in a 13-week gavage study. The LOAEL was 250 mg/kg-day in this study. An uncertainty factor of 3000 was applied. Confidence in the oral RfD is low. The kidney, liver and blood cells are chosen as the target organs for prolonged oral exposure to fluoranthene. EPA (1997) derived a provisional subchronic oral RfD for fluoranthene of 4E-1 mg/kg-day from the same mouse study using an uncertainty factor of 300.

Subchronic exposure to fluorene induces hemolytic anemia in orally treated mice (EPA, 2011). A verified RfD of 4E-2 mg/kg-day for chronic oral exposure was derived from a NOAEL of 125 mg/kg-day in a 13-week gavage study. The LOAEL was 250 mg/kg-day in this study. An uncertainty factor of 3000 was applied. Confidence in the oral RfD is low. The erythrocyte is the target organ for prolonged oral exposure to fluorene. EPA (1997) derived a provisional subchronic oral RfD for fluorene of 4E-1 mg/kg-day from the same mouse study using an uncertainty factor of 300.

Single-dose LD_{50} values for naphthalene include 533 to 710 mg/kg for mice and 2200 to 2400 mg/kg for rats, establishing the mouse as more sensitive to the lethal effects of acute oral exposure (ATSDR, 1995b). Decreased terminal body weights, accompanied by a remarkable absence of hematological and histopathological effects, were observed in rats treated by gavage for 13 weeks (EPA, 2011). The LOAEL in this study was 142 mg/kg-day associated with greater than 10 percent reduction in terminal body weights. The NOAEL was 71 mg/kg-day. The high dose rate, 286 mg/kg-day was a FEL associated with increased mortality. Application of an uncertainty factor of 3000 (10 to extrapolate from rats to humans, 10 to protect sensitive humans, 10 to extrapolate from subchronic to chronic exposure, and 3 for database deficiencies) to the NOAEL of 71 mg/kg-day yields the verified chronic oral RfD of 2E-2 mg/kg-day. Confidence in the RfD is low. A preliminary subchronic oral RfD can be derived for naphthalene by applying an uncertainty factor of 300 to the NOAEL of 71 mg/kg-day described above. The uncertainty factor of 300 reflects the chronic uncertainty factor of 3000 without the factor of 10 to expand from subchronic to chronic exposure. The preliminary subchronic oral RfD so derived is 2E-1 mg/kg-day.

The key study described above is not sufficient to identify target organs for prolonged oral exposure to naphthalene. Adults, children and neonates exposed to moth balls exhibit hemolytic anemia, evidence of liver disease and neurological deficits (EPA, 1993a, 1998). The liver effects and neurological deficits may be secondary to hemolytic anemia and reduced oxygen-carrying capacity of the blood. Hemolytic anemia and cataract formation have been seen also in orally exposed humans (EPA, 1998). The data suggest that the erythrocyte may be the most sensitive tissue in humans. Among common species of laboratory mammals, hemolytic anemia is seen only in dogs (EPA, 1998). Cataracts are seen in several laboratory mammals, but only at relatively high doses. The key study identifies reduced body weight as the critical effect in rats. Rats, however, do not exhibit hemolytic anemia, and exhibit cataracts only at very high doses,

suggesting that rats may not be a totally acceptable model for the toxicity of naphthalene to humans. Therefore, based on the effects observed in humans, the erythrocyte and eye are selected as target organs for prolonged oral exposure to naphthalene. Reduced body weight is also included as a critical effect because this was the only endpoint observed in rats in the key study.

EPA (1993a, 2011) reported a 2-year study in which mice were exposed to naphthalene vapors for 6 hours/day on 5 days/week. Inflammation of the nasal and olfactory epithelium was the most consistently observed sign; granulomatous lesions in the lungs were also observed. There was equivocal evidence of hematologic involvement. The lowest exposure concentration, 10 ppm, was a LOAEL for the nasal effects, which are considered the critical effects of inhalation exposure. The LOAEL is equivalent to a human equivalent concentration of 9.3 mg/m^3 (EPA, 2011). Application of an uncertainty factor of 3000 yields a verified chronic inhalation RfC of 3E-3 mg/m^3, which is equivalent to a chronic inhalation RfD of 8.6E-4 mg/kg-day. The nasal and olfactory epithelia are the target organs for inhalation exposure to naphthalene. Confidence in the RfC is medium. The chronic inhalation RfC of 3E-3 mg/m^3, equivalent to an inhalation RfD of 8.6E-4 mg/kg-day, is adopted as sufficiently protective for subchronic inhalation exposure as well.

Subchronic exposure to pyrene induces mild renal tubular degeneration and reduced kidney weight in orally treated mice (EPA, 2011). A verified RfD of 3E-2 mg/kg-day for chronic oral exposure was derived from a NOAEL of 75 mg/kg-day in a 13-week gavage study. The LOAEL was 125 mg/kg-day in this study. An uncertainty factor of 3000 was applied. Confidence in the oral RfD is low. The kidney tubule is chosen as the target organ for chronic oral exposure to pyrene. EPA (1997) derived a provisional subchronic oral RfD for pyrene of 3E-1 mg/kg-day from the same mouse study using an uncertainty factor of 300.

Data regarding prolonged oral exposure are not available for several of the Group D PAHs, which hinders estimation of an RfD or RfC and compromises evaluation of the potential for noncancer effects. Therefore, surrogates are used to develop toxicity values for the noncancer effects.

Generally surrogates are chosen on the basis of the following hierarchy:

- Toxicological similarity (effects and dose-response relationship).
- Toxicokinetic similarity, assuming that likeness in absorption, distribution and especially products of biotransformation suggests toxicological similarity.
- Structural similarity, assuming that likeness in structure suggests similarity in toxicokinetics.

Selection of defensible surrogates for the PAHs is compromised because toxicological and toxicokinetic data are virtually non-existent (except for benzo[a]pyrene), and the structural similarities often are not very convincing, which imparts a great deal of uncertainty to the effort. Therefore, the most defensible approach for some of the PAHs is to select the most conservative surrogate; i.e., the PAH with the smallest verified oral RfD, which happens to be pyrene.

Data regarding the effects of chronic or subchronic exposure to acenaphthylene were not located in the available literature. Acenaphthene is adopted as a reasonable surrogate for acenaphthylene based on structural similarity, since the surrogate differs from the principal chemical only in the presence of two hydrogen atoms and the absence of a double bond. Therefore, the verified chronic oral RfD of 6E-2 mg/kg-day for acenaphthene is adopted as the RfD for chronic oral exposure to acenaphthylene. The liver, which is the target organ for acenaphthene, is adopted for oral exposure to acenaphthylene. Similarly, the provisional subchronic oral RfD of 6E-1 mg/kg-day for acenaphthene is adopted as the RfD for subchronic oral exposure to acenaphthylene.

Data regarding the effects of chronic or subchronic exposure to benzo(g,h,i)perylene were not located in the available literature. Pyrene is adopted as a reasonable surrogate for benzo(g,h,i)perylene based somewhat on structural similarity, but more on the selection of a conservative approach as justified above. Therefore, the verified oral RfD of 3E-2 mg/kg-day for pyrene is adopted as the oral RfD for chronic exposure to benzo(g,h,i)perylene. Similarly, the provisional subchronic oral RfD of 3E-1 mg/kg-day for pyrene is adopted as the RfD for subchronic oral exposure to benzo(g,h,i)perylene. The kidney tubule, which is the target organ for pyrene, is adopted for oral exposure to benzo(g,h,i)perylene.

Relevant data regarding chronic or subchronic exposure to phenanthrene were not located. Potential surrogates based on similarity in chemical structure include anthracene and pyrene. Pyrene is selected as the surrogate only because it is the more conservative choice. Therefore, the verified oral RfD of 3E-2 mg/kg-day for pyrene is adopted as the oral RfD for chronic exposure to phenanthrene. Similarly, the provisional subchronic oral RfD of 3E-1 mg/kg-day for pyrene is adopted as the RfD for subchronic oral exposure to phenanthrene. The kidney tubule, which is the target organ for pyrene, is adopted for oral exposure to phenanthrene.

Data regarding inhalation exposure sufficient for development of inhalation RfCs were not located for any of the PAHs with the exception of naphthalene as noted above.

6.0 Carcinogenicity Evaluation

Acenaphthylene, anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene and pyrene are classified in EPA cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans) because of a lack of human data and inadequate animal data (EPA, 2011). Data regarding the carcinogenicity of acenaphthene were not located. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, , chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene are classified in EPA weight-of-evidence Group B2 (probable human carcinogens) (EPA, 1997, 2011). Benzo(a)pyrene is the most extensively studied member of the class, inducing tumors in tissues at the point of contact of practically all laboratory species tested by all routes of exposure.

Although epidemiology studies suggested that complex mixtures that contain PAHs (coal tar, soots, coke oven emissions, cigarette smoke) are carcinogenic to humans, the carcinogenicity cannot be attributed to PAHs alone because of the presence of other potentially carcinogenic substances in these mixtures (ATSDR, 1995a). In addition, recent investigations showed that the PAH fraction of roofing tar, cigarette smoke and coke oven emissions accounted for only 0.1-8% of the total mutagenic activity in *Salmonella* of the unfractionated complex mixture (Lewtas, 1988). Aromatic amines, nitrogen heterocyclic compounds, highly oxygenated quinones, diones,

and nitrooxygenated compounds, none of which would be expected to arise from in vivo metabolism of PAHs, probably accounts for the majority of the mutagenicity of coke oven emissions and cigarette smoke. Furthermore, coal tar, which contains a mixture of many PAHs, has a long history of use in the clinical treatment of a variety of skin disorders in humans (ATSDR, 1995a).

Because of the lack of human cancer data, assignment of individual PAHs to EPA cancer weight-of-evidence groups is based largely on the results of animal studies with large doses of purified compound (EPA, 2011). Frequently, unnatural routes of exposure, including implants of the test chemical in beeswax and trioctanoin in the lungs of female rats, intratracheal instillation, and subcutaneous or intraperitoneal injection, were used. Although the carcinogenicity of benzo(a)pyrene in animals managed in an unnatural manner in laboratory conditions has been well established, the potential for carcinogenicity to humans in environmental settings involving exposure to low concentrations remains unclear.

EPA (200) verified a SF for oral exposure to benzo(a)pyrene of 7.3E+0 per mg/kg-day, based on several dietary studies in mice and rats. Recent reevaluations of the carcinogenicity and mutagenicity of the Group B2 PAHs suggest that there are large differences between individual PAHs in cancer potency (Krewski et al., 1989). Based on the available cancer and mutagenicity data, and assuming that there is a constant relative potency between different potential carcinogens across different bioassay systems and that the PAHs under consideration have similar dose-response curves, EPA (1993b) adopted relative potency values for several PAHs. These values and the corresponding oral SFs, based on a relative potency for benzo(a)pyrene of 1.0, are presented below:

Relative Potency Estimates for PAHs				
			Inhalation	
PAH	Relative Potency	Oral Slope Factor (per mg/kg-day)	Unit Risk Factor (per µg/m^3)	Slope Factor (per mg/kg-day)
Benzo(a)pyrene	1.0	7.3E+0	8.8E-4	3.1E+0
Benzo(a)anthracene	0.1	7.3E-1	8.8E-5	3.1E-1
Benzo(b)fluoranthene	0.1	7.3E-1	8.8E-5	3.1E-1
Benzo(k)fluoranthene	0.01	7.3E-2	8.8E-6	3.1E-2
Chrysene	0.001	7.3E-3	8.8E-7	3.1E-3
Dibenz(a,h)anthracene	1.0	7.3E+0	8.8E-4	3.1E+0
Indeno(1,2,3-cd)pyrene	0.1	7.3E-1	8.8E-5	3.1E-1

Although the EPA has not verified SFs for Group B2 PAHs other than benzo(a)pyrene, the SFs above represent reasonable estimates based on the data available. The relative potency approach employed here meets criteria considered to be desirable for this type of analysis (Lewtas, 1988). For example, the chemicals compared have similar chemical structures and would be expected to have similar toxicokinetic fate in mammalian systems. In addition, the available data suggest that the Group B2 PAHs have a similar mechanism of action, inducing frameshift mutations in *Salmonella* and tumor initiation in the mouse skin painting assay. Similar noncancer effects (minor changes in the blood, liver, kidneys) of the Group D PAHs support the hypothesis of a common mechanism of toxicity. Finally, the same endpoints of toxicity, i.e., potency in various cancer assays, and related data, were used to derive the relative potency values (Krewski et al., 1989). The oral SF for benzo(a)pyrene of 7.3E+0 per mg/kg-day, and the SFs presented above for the other Group B2 PAHs are adopted for the purposes of this evaluation.

An EPA (1994) evaluation of the inhalation cancer data suggests adoption of an inhalation SF for benzo(a)pyrene of 3.1E+0 per mg/kg-day, based on the incidence of upper respiratory and digestive tract tumors in hamsters. Applying the relative potency estimates presented above yield the inhalation URFs and SFs for the other Group B2 PAHs presented above.

EPA (2011) classified naphthalene in EPA cancer weight-of-evidence group C – possible human carcinogen – based on benign respiratory tumors and one carcinoma in female mice exposed to naphthalene by inhalation. Cancer potency factors are not available because the data are not sufficient.

7.0 Toxicity Summary

Toxicity values for the PAHs are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
Acenaphthene										
6E-1	6E-2	L	ND	ND	NA	ND	NA	ND	NA	NA
Acenaphthylene										
6E-1	6E-2	L	ND	ND	NA	D	NA	D	NA	NA
Anthracene										
3E+0	3E-1	ND	ND	ND	NA	D	NA	D	NA	NA
Benzo(a)anthracene										
ND	ND	NA	ND	ND	NA	B2	7.3E-1	B2	8.8E-5	3.1E-1
Benzo(a)pyrene										
ND	ND	NA	ND	ND	NA	B2	7.3E+0	B2	8.8E-4	3.1E+0
Benzo(b)fluoranthene										
ND	ND	NA	ND	ND	NA	B2	7.3E-1	B2	8.8E-5	3.1E-1
Benzo(k)fluoranthene										
ND	ND	NA	ND	ND	NA	B2	7.3E-2	B2	8.8E-6	3.1E-2
Benzo(g,h,i)perylene										
3E-1	3E-2	K	ND	ND	NA	D	NA	D	NA	NA
Chrysene										
ND	ND	NA	ND	ND	NA	B2	7.3E-3	B2	8.8E-7	3.1E-3
Dibenz(a,h)anthracene										
ND	ND	NA	ND	ND	NA	B2	7.3E+0	B2	8.8E-4	3.1E+0
Fluoranthene										
4E-1	4E-2	L,K,B	ND	ND	NA	D	NA	D	NA	NA
Fluorene										
4E-1	4E-2	E	ND	ND	NA	D	NA	D	NA	NA
Indeno(1,2,3-cd)pyrene										
ND	ND	NA	ND	ND	NA	B2	7.3E-1	B2	8.8E-5	3.1E-1
Naphthalene										
2E-1	2E-2	E, Ey, BW	3E-3/ 8.6E-4	3E-3/ 8.6E-4	Ne, Oe	C	ND	C	ND	ND
Phenanthrene										
3E-1	3E-2	K	ND	ND	NA	D	NA	D	NA	NA
Pyrene										
3E-1	3E-2	K	ND	ND	NA	D	NA	D	NA	NA

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: B = blood cells; BW = reduced body weight; E = erythrocyte; Ey = eye; L = liver; K = kidney; Ne = nasal epithelium; Oe = olfactory epithelium.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 1995a, ***Update Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)***, U.S. Public Health Service, Atlanta, Georgia, August, on line.

Agency for Toxic Substances and Disease Registry, (ATSDR), 1995b, ***Update Toxicological Profile for Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene***, U.S. Public Health Service, Atlanta, Georgia, August, on line.

De Jong, W.H., E.D. Kroes, J.G. Vos and H. Van Loveren, 1999, "Detection of Immunotoxicity of Benzo[a]pyrene in a Subacute Toxicity Study after Oral Exposure in Rats," ***Toxicological Sciences*** 50: 214-220.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

Krewski, D., T. Thorslund and J. Withey, 1989, "Carcinogenic Risk Assessment of Complex Mixtures," ***Toxicology and Industrial Health***, 5: 851-867.

Lewtas, J., 1988, "Genotoxicity of Complex Mixtures: Strategies for the Identification and Comparative Assessment of Airborne Mutagens and Carcinogens from Combustion Sources," ***Fundamental and Applied Toxicology***, 10: 571-589.

Potter, T.L. and K.E. Simmons, 1998, ***Composition of Petroleum Mixtures***, Volume 2, Total Petroleum Hydrocarbon Criteria Working Group Series, University of Massachusetts, Amherst, May.

U.S. Environmental Protection Agency (EPA), 1986, "Guidelines for Carcinogen Risk Assessment," ***Federal Register*** 51(185): 33992-34003.

U.S. Environmental Protection Agency (EPA), 1990, "National Oil and Hazardous Substances Pollution Contingency Plan," ***Federal Register*** 55(46): 8666-8865.

U.S. Environmental Protection Agency (EPA), 1993a, ***Risk Assessment Issue Paper for: Derivation of a Subchronic RfC for Naphthalene (CASRN 91-20-3)***, National Center for Environmental Assessment, Cincinnati, Ohio, March 12.

U.S. Environmental Protection Agency (EPA), 1993b, ***Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons***, Office of Health and Environmental Assessment, Cincinnati, Ohio, EPA/600/R-93/089, March.

U.S. Environmental Protection Agency (EPA), 1994, ***Risk Assessment Issue Paper: Status of Inhalation Cancer Unit Risk for Benzo(a)Pyrene (CAS No. 50-32-8)***, National Center for Environmental Assessment, Cincinnati, Ohio, November 18.

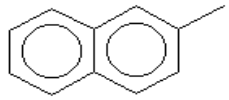
U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 1998, ***Toxicological Review of Naphthalene (CAS No. 91-20-3) In Support of Summary Information on the Integrated Risk Information System (IRIS)***, August.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

METHYLNAPHTHALENES



2-Methylnaphthalene

1.0 Introduction and Physical Properties

The methylnaphthalenes are the simplest alkylated polyaromatic hydrocarbons (PAH). Two monomethylnaphthalene isomers are possible: 1-methylnaphthalene (occasionally incorrectly called 4-methylnaphthalene) (90-12-0) and 2-methylnaphthalene (91-57-6). A commercial preparation of mixed isomers (1321-94-4) is mentioned (ATSDR, 2005; HSDB, 2011), but the proportion of the individual isomers was not reported. Both 1- and 2-methylnaphthalene are **VOCs**. 1-Methylnaphthalene occurs as a colorless liquid in the pure form at ambient temperatures (HSDB, 2011). 2-Methylnaphthalene reportedly occurs as a solid, but the melting point is 34.6 °C (approximately 94 °F), indicating that at high ambient temperatures the compound would occur as a liquid.

1-Methylnaphthalene is a component of petroleum and a product of incomplete combustion (HSDB, 2011). The compound is also used as a chemical intermediate and a general solvent. 2-Methylnaphthalene is used as an intermediate in organic chemical synthesis, as a dye carrier, in the manufacture of pesticides, as an adjuvant in pesticide formulations, and, in its pure form, in the manufacture of vitamin K. 2-Methylnaphthalene also is a component of crude oil and a product of combustion, which is produced and released to the environment during natural fires. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
1-Methylnaphthalene (90-12-0)										
142.19[a]	3.87[a]	5.14E-4[a] (25°C)	3.36[a]	6.97E-2[b] (25°C)[c]	8.08E-6[b] (25°C)[c]	8.82E-5[a] (25°C)	2.58E+1[a] (25°C)	515[d]	772[d]	1.37E+4[d]
2-Methylnaphthalene (91-57-6)										
142.20[a]	3.86[e]	5.18E-4[e] (25°C)[c]	3.60[ae]	6.97E-2[b] (25°C)[c]	8.08E-6[b] (25°C)[c]	7.24E-5[a] (25°C)	41.4E+1[e] (25°C)	514[d]	761[d]	1.08E+4[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K):. $H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); ND = no data.

[a]Hazard Substances Data Bank (HSDB), 2011, National Library of Medicine.
[b]Calculated as described in Introduction to Toxicity Profiles.
[c]Assumed.
[d]National Institute of Standards and Technology (NIST), 2011, *NIST Chemistry WebBook*, on line.
[e] U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*.

2.0 Environmental Fate and Transport

Emissions from petroleum refining, coal tar distillation, and gasoline and diesel fueled engines are major contributors of methylnaphthalenes to the environment (HSDB, 2011). Because of the widespread use of the methylnaphthalenes in a variety of products, they are also released to the environment in manufacturing effluents, the disposal of waste byproducts, through landfills,

municipal waste water treatment facilities and waste incinerators. Forest fires and uncontrolled combustion are relatively insignificant contributors (ATSDR, 2005).

Based upon their relatively high vapor pressure, the methylnaphthalenes are expected to exist entirely in the vapor phase in ambient air (HSDB, 2011). Direct photolysis of the methylnaphthalenes is likely to occur; however, only aqueous photolysis data are available. Reactions of the methylnaphthalenes with photochemically produced hydroxyl radicals (half-life = 7.4 hours) and ozone (half-life = 29 to 88 days) are likely to be important removal processes in ambient air. The formation of nitro derivatives in night-time air is also likely to be an important removal process for these compounds.

Data regarding the biodegradation of the methylnaphthalenes in soil were not available (HSDB, 2011). However, based upon aqueous screening test data and die-away tests for ground and marine water, the methylnaphthalenes are expected to biodegrade fairly rapidly in soils acclimated to PAHs and at a moderate rate in unacclimated soils. The methylnaphthalenes are not expected to undergo hydrolysis in soils; however, they are expected to undergo direct photolysis in sunlit surface soils. Mobility in soil is likely to be very low. Volatilization from moist soils may be a significant removal mechanism, although it will be attenuated by adsorption.

The methylnaphthalenes will partition from the water column to organic matter contained in sediments and suspended solids (HSDB, 2011). Volatilization is likely to be an important removal process for these compounds. Volatilization half-lives for a model river and model lake were estimated to be 5.5 hours and 5.3 days, respectively. The methylnaphthalenes are expected to degrade rapidly in marine water and waters acclimated to PAHs. Degradation is expected to be less rapid in unacclimated aquatic systems. The methylnaphthalenes are not expected to undergo hydrolysis in water; however, direct photolysis in sunlit waters is likely to be a significant removal process. The direct photolysis half-life for midday, midsummer sunlight at 40˚ N latitude was predicted to be 22 and 54 hours for 1- and 2-methylnaphthalene, respectively, in water solution.

The methylnaphthalenes are not expected to participate significantly in food-chain pathways (ATSDR, 2005; HSDB, 2011); therefore, biotransfer factors are not provided.

3.0 Toxicokinetics

Data regarding the toxicokinetics of the methylnaphthalenes are very limited. Data regarding the toxicokinetics of naphthalene, often used as a surrogate for the methylnaphthalenes, is somewhat more complete.

The observation that inhalation exposure to naphthalene leads to adverse effects in humans suggests that the methylnaphthalenes are also absorbed by the respiratory tract (ATSDR, 2005).

An excretion study with radiolabeled 2-methylnaphthalene in guinea pigs suggests that GI absorption is rapid and nearly complete, as 80 percent of the administered dose of radioactivity was recovered from the urine within 24 hours (ATSDR, 2005).

Data were not located regarding dermal uptake of the methylnaphthalenes. However, serious adverse health effects have been observed in humans dermally exposed to naphthalene, and animal studies show that naphthalene is rapidly and extensively absorbed through the skin, although using soil as the vehicle slows dermal absorption (ATSDR, 2005). These observations suggest that dermal uptake of the methylnaphthalenes may be significant.

Limited distribution data following oral administration of radiolabeled 2-methylnaphthalene to guinea pigs revealed the presence of radioactivity in the liver almost immediately after treatment (ATSDR, 2005). Relatively high levels were located in the gall bladder, liver and kidney, all of which represent excretion. Data from orally administered naphthalene suggests that distribution to adipose tissue is probably substantial, and that the methylnaphthalenes will probably cross the placenta and distribute to milk. As stated above, naphthalene is often used as a surrogate for the methylnaphthalenes because of structural similarity. Similarity in structure implies similarity in physical, chemical, toxicokinetic and toxicological characteristics.

The sole initial step in naphthalene metabolism is oxidation at the 1,2-position to form the epoxide, 1,2-naphthalene oxide (ATSDR, 2005). The epoxide may rearrange spontaneously to form 1- and 2-naphthol, or undergo enzymatic conversion to 1,2-dihydroxy, 1,2-dihydronaphthalene. The epoxide formed in the first step is recognized as an intermediate that reacts with tissue macromolecules inducing toxic effects, particularly in the lung. 1-Naphthol may undergo further oxidation to form 1,4-naphthoquinone, which has also been shown to interact with macromolecules, particularly in the liver. 1,2-Dihydroxy, 1,2-dihydronaphthalene may undergo further oxidation to form 1,2-naphthoquinone or 1,2-dihydroxy-3,4-epoxy-1,2,3,4-tetrahydronaphthalene. 1,2-Naphthoquinone may be the ultimate toxicant associated with naphthalene-induced cataracts. The toxicological significance of 1,2-dihydroxy-3,4-epoxy-1,2,3,4-tetrahydronaphthalene is unclear.

The presence of the methyl group on 1- or 2-methylnaphthalene may greatly alter the metabolic scheme for these chemicals compared with naphthalene. Data are available only for 2-methylnaphthalene, but the metabolism of 1-methylnaphthalene may be similar. The predominant pathway of 2-methylnaphthalene metabolism involves stepwise oxidation of the methyl group to form 2-hydroxymethylnaphthalene and 2-naphthoic acid, possibly through the aldehyde intermediate (ATSDR, 2005). This pathway accounts for 50 to 80 percent of 2-methylnaphthalene, depending on the species. The end products of this pathway are conjugated with glycine or glucuronic acid and excreted. Ring epoxidation at the 3,4-, 5,6- or 7,8- positions accounts for 15 to 20 percent of 2-methylnaphthalene. These epoxides may be subject to conjugation or may be further oxidized to form the corresponding dihydrols and other derivatives, which in turn undergo conjugation. Experiments with mice suggest that glutathione conjugation may be an important detoxication mechanism. Although data regarding the biological activity of methylnaphthalene metabolites is not as complete as data regarding the biological activity of the naphthalene metabolites, the differences in the metabolites formed are considerable.

Data regarding excretion of the methylnaphthalenes is limited to a study of 2-methylnaphthalene in guinea pigs. Approximately 80 percent of the radiolabel from a single oral dose was recovered within 24 hours in the urine; approximately 10 percent was recovered from the feces. Conjugated metabolites of the products of methyl group oxidation accounted for approximately 76 percent of

the recovered radioactivity. Approximately 18 percent of the recovered radiolabel represented epoxidation at the 7,8- positions.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly (50 percent) less than complete. Therefore, no GAF is developed for the methylnaphthalenes and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Data were not located regarding the dermal uptake of the methylnaphthalenes from soil. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of the methylnaphthalenes from soil is not evaluated. t*, K_p, τ, FA and B values are estimated by the EPA (2004) method as follows:

Chemical	t*	K_p	τ	FA	B
1-Methylnaphthalene	1.58	9.08E-2	0.657	1	0.42
2-Methylnaphthalene	1.58	8.94E-2	0.657	1	0.41
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

Data regarding the effects of human exposure to 1-methylnaphthalene were not located. Subchronic and chronic dietary studies with 1-methylnaphthalene in mice suggest that the toxic potency is low. An increased incidence of pulmonary alveolar proteinosis was the only lesion observed in mice treated at a dose rate of 73 mg/kg-day (lowest dose rate tested) in an 81-week study, but not in mice treated at a dose rate of approximately 1200 mg/kg-day (highest dose rate tested) in a 13-week study (EPA, 1998). These observations suggest that duration of exposure is very important in the toxicity of 1-methylnaphthalene. No RfD is identified for 1-methylnaphthalene. Therefore, it is recommended that 2-methylnaphthalene be used as a surrogate and discussed qualitatively in human health risk assessment.

Effects in humans from exposure to low levels of 2-methylnaphthalene appear to be limited to skin irritation and photosensitization (HSDB, 2011). Acute exposure to high levels may induce headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and coma.

EPA (2011) has provided a verified RfD of 4E-3 mg/kg-day based on pulmonary alveolar proteinosis in an 81-week oral study in mice (Murata et al., 1997). The 2-methylnaphthalene was administered at various dose levels in food. A statistically significant increase in the critical effect was observed in the lowest dose administered (50.3/54.3 mg/kg-day [female/male]). A benchmark dose level assuming 5 percent extra risk of pulmonary alveolar proteinosis of 4.7 mg/kg-day, with a 95 percent lower confidence limit of 3.5 mg/kg-day. UF values of 10 each were applied for interspecies differences, intraspecies variation, and database deficiencies for a composite UF of 1,000. Confidence in the RfD is regarded as low (EPA. 2011). No EPA-derived

subchronic oral RfD is available for the methylnaphthalenes. However, a preliminary subchronic oral RfD is assumed to be equal to the chronic RfD.

Data regarding chronic inhalation exposure of humans or animals to 1- or 2-methylnaphthalene were not located in the available literature. EPA (2011) concluded that an RfC cannot be calculated for 2-methylnaphthalene due to inadequate data. Neither were any epidemiological studies or case studies located which examined the potential effects of 1-methylnaphthalene or 2-methylnaphthalene (EPA, 2011). Therefore, no RfC is identified for either compound.

6.0 Carcinogenicity Evaluation

Under EPA's guidelines for carcinogen risk assessment, the database regarding the carcinogenicity of 2-methylnaphthalene in mice and the lack of human carcinogenicity data are inadequate to assess human carcinogenic potential (EPA, 2011). Therefore no oral SF has been idenifed. Although Murata et al., (1997) identified an increased incidence of pulmonary tumors in male mice at the lowest dose, the results of the study did not indicate an increased incidence of tumors at the high dose, nor were increased incidences of tumor observed in female mice. No studies were identified that suggest that inhalation exposure to 2-methylnaphthelene may cause cancer. Therefore, no unit risk has been verified (EPA, 2011). Neither was any information located to suggest that 1-methylnaphthalene is carcinogenic.

7.0 Toxicity Summary

Toxicity values for 1- and 2-methylnaphthalene are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
2E-1	2E-2	Lung	ND	NA	NA	D	NA	D	NA	NA

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); NA = not applicable.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 2005, ***Update Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene***, U.S. Department of Health and Human Services, Atlanta, Georgia, August

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line, accessed 14 December.

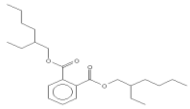
Murata, Y., A. Denda, H. Maruyama et al., 1997, "Short Communication: Chronic Toxicity and Carcinogenicity Studies of 2-Methylnapthalene in B6C3F1 Mice," ***Fundamental and Applied Toxicology***, Volume 36, pp. 90-93.

U.S. Environmental Protection Agency (EPA), 1998, ***Toxicological Review of Naphthalene (CAS No. 91-20-3) In Support of Summary Information on the Integrated Risk Information System (IRIS)***, August.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

BIS(2-ETHYLHEXYL)PHTHALATE



1.0 Introduction and Physical Properties

Bis(2-ethylhexyl)phthalate (BEHP) is a large group of phthalic acid esters (PAE) which are ubiquitous compounds with considerable variability regarding physical characteristics. The PAEs of common environmental interest occur as clear, pale or colorless oily or viscous liquids, except for dimethyl phthalate, which occurs as pale yellow crystals at room temperature (HSDB, 2011). Virtually all of the PAEs are regarded as SVOCs, including BEHP. The PAEs are used predominantly to impart flexibility to plastics, which may contain up to 50 percent PAE by weight (ATSDR, 1995, 1997, 2001, 2002; EPA, 1991). Diethyl phthalate is used largely in plastics for food packaging. Minor uses include pesticide carriers, cosmetics, fragrances, munitions, industrial oils and insect repellents. Relevant physical properties for the more environmentally important PAEs are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
bis(2-Ethylhexyl)phthalate (SVOC) (117-81-7)										
391[a]	5.11[a]	1.02E-7[b] (25°C)	7.18[b]	3.51E-2[b] (25°C)	3.66E-6[b] (25°C)	9.51E-11[c] (25°C)	3.40E-1[b] (20-25°C)	NA	NA	NA

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);,$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); NA = not applicable.

[a]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.

[c]Hazard Substances Data Bank (HSDB), 2005, National Library of Medicine, on line, accessed 13 December.

[d]U.S. Environmental Protection Agency (EPA), 2004, ***EPI Suite Version 3.12*** Software for estimating physical properties, online, 30 November.

[e]Calculated as described in Introduction to Toxicity Profiles.

[f]Assumed.

[g]U.S. Environmental Protection Agency (EPA), 2003, ***Users Guide for Evaluating Subsurface Vapor Intrusion into Buildings***, Office of Emergency and Remedial Response, Washington, D.C., 19 June.

2.0 Environmental Fate and Transport

The PAEs are widely used and are released inadvertently and in waste streams during their production, use and disposal, either in landfills or by incineration (ATSDR, 1995, 1997, 2001, 2002; EPA, 1991). BEHP and diethyl phthalate are the PAEs most frequently encountered in environmental media.

The rather low VP value indicates that the BEHP exists primarily in the particulate phases in the atmosphere (ATSDR, 1995, 1997, 2001, 2002; HSDB, 2011). Particulate phase PAEs are physically removed from the atmosphere by wet and dry deposition.

PAEs in soil sorb to other soil constituents, the extent of adsorption directly related to molecular weight (ATSDR, 1995, 1997, 2001, 2002; HSDB, 2011). BEHP is expected to be practically immobile in soil. Biodegradation is probably the most important removal process for BEHP under aerobic conditions and, for some of the PAEs, also under anaerobic conditions. Volatilization is not expected to be significant from either wet or dry soil.

BEHP released to water sorbs to sediment and deposit on the bottom (ATSDR, 1995, 1997, 2001, 2002; HSDB, 2011). Hydrolysis is expected to occur slowly or practically not at all. Biodegradation is the most significant removal process. Volatilization from water surfaces is not expected to be significant.

Empirical data in fish suggest that bioconcentration is somewhat less than predicted by models based on K_{ow}, probably because fish efficiently metabolize the PAEs (ATSDR, 1995, 1997, 2001, 2002; HSDB, 2011). For example, experiments with rainbow trout (*Salmo gairdneri*) showed that the majority of radiolabeled BEHP did not reach the systemic circulation of the fish, but was present in the exposure water as metabolites as a result of presystemic branchial metabolism of this compound during uptake from the water to the blood. The limited empirical data indicate that BCF values are larger for aquatic organisms at the lower trophic levels. EPA (1995a) lists the PAEs as compounds that are not bioaccumulative chemicals of concern in fish. Bioaccumulation in terrestrial food chains is unlikely because mammals readily metabolize and eliminate the PAEs (ATSDR, 1995, 1997, 2001, 2002; HSDB, 2011). Therefore, biotransfer factors are not developed for the PAEs.

3.0 Toxicokinetics

The toxicokinetics of BEHP have been studied more intensively than the other PAEs, but some data are available for the others. All the PAEs appear to behave similarly regarding toxicokinetics. The available data indicate that the PAEs are absorbed from the respiratory tract, although quantitative data were not located (ATSDR, 1995, 1997, 2001, 2002).

Data regarding GI absorption of the PAEs is incomplete and inconsistent. ATSDR (2002) concluded that approximately 20 to 25 percent of ingested BEHP is absorbed, based on urinary excretion of metabolites (11-15 percent of a single oral dose) and the observation in laboratory animals that biliary excretion is significant. However, there appear to be substantial species differences in the extent of biliary excretion, and therefore, the potential for enterohepatic recirculation. It seems likely that GI uptake of BEHP and its various intestinal hydrolysis products is essentially complete, although enterohepatic recirculation and other routes of excretion may mask its true extent, depending on the position of radiolabeled carbon used in the tracer studies. Also, animal studies indicate that GI absorption in saturable so that efficiency of absorption decreases with increasing dose.

Dermal uptake may be substantial for neat diethyl phthalate; *in vivo* studies in rats indicate approximately 50 percent absorption (ATSDR, 1995). Tests with the other PAEs in the same study showed that the rate and extent of dermal uptake was inversely correlated with the length (above four carbon atoms) of the side chain.

The results of tissue distribution studies can be confounded by the presence of PAEs used as components of laboratory plasticware (ATSDR, 2002). Highest tissue levels, however, appear in adipose tissue, liver, kidney and blood.

Metabolism of the PAEs appears to follow the same pattern in all species, namely hydrolysis of one or both ester linkages followed by oxidation of the remaining attached or the released side chain, possibly with reduction of the number of carbon atoms (ATSDR, 1997, 2002). Conjugation with glucuronic acid also occurs.

Excretion of PAE metabolites occurs via the kidney, but biliary excretion is also important (ATSDR, 1995, 1997, 2001, 2002). It is possible that smaller carbon units from hydrolysed side chains may be assimilated into the 1- or 2-carbon pool, eventually to be released as exhaled carbon dioxide, although the data are unclear.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAFs are developed for the PAEs and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Data with neat PAEs or compound applied using organic solvents indicate that dermal uptake is substantial, although less in humans than laboratory animals (ATSDR, 2001, 2002). Data regarding the dermal uptake of the PAEs from soil were not located. The EPA (2004) default ABS for SVOCs of 0.1 is used for BEHP.

EPA (2004) provides t*, K_p, τ, FA and B values for BEHP which are shown in the following table.

Chemical	t*	K_p	τ	FA	B
bis(2-Ethylhexyl)phthalate[a]	39.93	2.5E-2	16.64	0.8	0.2

T* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); □ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).
[a] Source: U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

ATSDR (1995) noted that the rate of dermal uptake of the PAEs is inversely correlated with the length of the side chain.

5.0 Noncancer Effects Evaluation

The acute oral toxicity of the PAEs is considered to be low, with oral LD_{50} values in laboratory animals ranging from 31 to 33 g/kg (ATSDR, 2002). Prolonged exposure induces liver effects in laboratory animals, but generally only at relatively high doses. EPA (2011) verified a chronic oral RfD of 2E-2 mg/kg-day for BEHP based on a LOAEL of 19 mg/kg-day in a one-year dietary study in guinea pigs. An uncertainty factor of 1000 was used. The uncertainty factor consisted of factors of 10 each for inter- and intra-species variation, and a factor of 10 both to estimate a NOAEL from a LOAEL and to expand to lifetime exposure. Confidence in the oral RfD is medium. The LOAEL is associated with mild liver effects, and the liver is considered the target organ for oral exposure to BEHP. EPA (1997) declined to adjust the uncertainty factor to develop a provisional subchronic oral RfD. Therefore, the chronic oral RfD for BEHP of 2E-2 mg/kg-day is adopted as sufficiently conservative for subchronic exposure as well.

6.0 Carcinogenicity Evaluation

EPA (2011) classified BEHP as a cancer weight-of-evidence Group B2 chemical (probable human carcinogen), based on significantly dose-related increases in liver tumor responses in rats and mice of both sexes in a two-year dietary study. The human data were inadequate. An oral SF of 1.4E-2 per mg/kg-day was based on liver tumors in male mice in this study. The inhalation unit risk of 2.4 $(\mu g/m^3)^{-1}$ was identified by EPA (2010), which was taken from the California Office of Environmental Health Hazard Assessment (2011) Toxicity Criteria Database. This value equals an inhalation SF of 8.4E-3 per mg/kg-day^{-1} and was derived based on the oral SF.

7.0 Toxicity Summary

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
2E-2	2E-2	L	ND	ND/ ND	NA	B2	1.4E-2	B2	2.4E-6	8.4E-3

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: L = liver.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1995, ***Toxicological Profile for Diethyl Phthalate***, U.S. Department of Health and Human Services, Atlanta, Georgia, June, on line.

Agency for Toxic Substances and Disease Registry (ATSDR), 1997, ***Toxicological Profile for Di-n-Octylphthalate***, U.S. Department of Health and Human Services, Atlanta, Georgia, September, on line.

Agency for Toxic Substances and Disease Registry (ATSDR), 2001, ***Update Toxicological Profile for Di-n-Butylphthalate***, U.S. Department of Health and Human Services, Atlanta, Georgia, September, on line.

Agency for Toxic Substances and Disease Registry (ATSDR), 2002, ***Update Toxicological Profile for Di(2-Ethylhexyl) Phthalate***, U.S. Department of Health and Human Services, Atlanta, Georgia, September, on line.

California Office of Environmental Health Hazard Assessment, 2011, Toxicity Criteria Database: Cancer Potency, on line.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

U.S. Environmental Protection Agency (EPA), 1991, ***Drinking Water Criteria Document for Phthalic Acid Esters (PAES)***,Prepared by the Environmental Criteria and Assessment Office, Cincinnati, Ohio for the Office of Water, Washington, D.C., ECAO-CIN-D009, NTIS No. PB92-173442.

U.S. Environmental Protection Agency (EPA), 1995, "40 CFR 9, 122, 123, 131, and 132 Final Water Quality Guidance for the Great Lakes System; Final Rule," ***Federal Register***, 60(56); 15366-15425.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

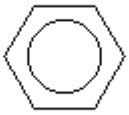
U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

U.S. Environmental Protection Agency (EPA), 2010, ***Regional Screening Level Table (November 2010)***, on line at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

VOLATILE ORGANIC COMPOUNDS

BENZENE (71-43-2)



1.0 Introduction and Physical Properties

Benzene is a naturally occurring **VOC**, present in low levels in many plants and animals, as well as a synthetic compound derived from petroleum (ATSDR, 1997). It occurs as a colorless or slightly yellow liquid, or as a solid at temperatures below approximately 5.5 EC (HSDB, 2011). Benzene is widely used as a solvent and in the manufacturing of other organic compounds such as styrene, phenol, detergents, pesticides, explosives, polychlorinated biphenyls, flavors, perfumes, paints and coatings, nylon intermediates and photographic chemicals, among others. It is also used in food processing and leather tanning and occurs as a component of gasoline. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
78.1[a]	2.13[a]	5.56E-3[b] (25°C)	1.77[b]	8.80E-2[b] (25°C)	9.80E-6[b] (25°C)	1.25E-1[c] (25°C)	1.75E+3[b] (20-25°C)	353.24[d]	562.16[d]	7.34E+3[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);.$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole).

[a]U.S. Environmental Protection Agency (EPA), 2004, *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)*, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

[b]U.S. Environmental Protection Agency (EPA), 2002, *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*, Final, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.

[c]Hazardous Substance Data Bank (HSDB), 2004, National Library of Medicine, on line, accessed 21 April.

[d]U.S. Environmental Protection Agency (EPA), 2003, *Users Guide for Evaluating Subsurface Vapor Intrusion into Buildings*, Office of Emergency and Remedial Response, Washington, D.C., 19 June.

2.0 Environmental Fate and Transport

Benzene enters the atmosphere primarily from fugitive emissions and automobile exhaust because of its presence in gasoline (ATSDR, 1997; HSDB, 2011). Other important sources are emissions associated with its production and use as a solvent, as an industrial intermediate in the production of the materials mentioned above, and coke oven blast furnaces and coke by-product recovery plants. In addition, there are discharges into water from industrial effluents and losses during spills. Sources of release to soil include land disposal of benzene-containing wastes, industrial discharge, and leaks from underground storage tanks and associated plumbing.

Benzene released to the atmosphere will exist almost exclusively in the vapor phase (ATSDR, 1997; HSDB, 2011). It is not subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of approximately 13 days. The reaction time in polluted atmospheres containing nitrogen oxides or sulfur dioxide is accelerated with the half-life being reported as 4 to 6 hours. Products of photooxidation include phenol, nitrophenols,

nitrobenzene, formic acid, and peroxyacetyl nitrate. Benzene is fairly soluble in water and is removed from the atmosphere in rain.

Benzene released to soil will be subject to rapid volatilization near the surface; that which does not evaporate will be highly to very highly mobile in the soil and may leach to groundwater (ATSDR, 1997; HSDB, 2011). Benzene may be subject to biodegradation under aerobic conditions. Microbial transformation proceeds through formation of cis-dihydrodiols to catechols, which lead to destruction of the aromatic ring.

Benzene may be subject to photooxidation and biodegradation in shallow, aerobic groundwaters, but probably not significantly under deeper or anaerobic conditions (ATSDR, 1997; HSDB, 2011). Benzene released to surface water will be subject to rapid volatilization. It is not expected to sorb to sediment or to hydrolyze significantly. Biodegradation is unlikely to be a significant fate process in sediment.

Benzene is not expected to participate significantly in food-chain pathways (ATSDR, 1997; EPA, 1995; HSDB, 2011); therefore, biotransfer factors are not provided.

3.0 Toxicokinetics

Benzene is rapidly and readily absorbed during inhalation exposures of humans or laboratory animals to vapors (ATSDR, 1997). However, the extent of uptake and retention decrease with increasing concentration or time of exposure, reflecting saturation of the metabolic processes that remove the substance from the blood. Excretion data from laboratory animals show that absorption is rapid and essentially complete following oral administration. Dermal uptake of liquid benzene through intact skin has been demonstrated in humans and may be toxicologically significant. The extent of dermal uptake of benzene vapor has not been quantified in humans, but experiments in laboratory animals suggest this exposure route also may be toxicologically significant.

Benzene is widely distributed following any route of exposure (ATSDR, 1997). Highest levels were located in adipose and other tissues high in fat such as the brain following inhalation exposure. Highest levels following oral administration were located in liver, kidney and bone marrow.

Quantitative aspects of the metabolism of benzene are somewhat species-, exposure route- and dose-dependent (ATSDR, 1997), but certain relevant generalizations pertain. The first metabolic step appears to be cytochrome P-450-catalyzed oxidation of benzene to benzene epoxide in the liver, which rearranges to phenol. Phenol is transformed to hydroxyquinone, which is further oxidized to benzoquinone, considered to be a major toxicant in bone marrow. Alternatively, phenol may be further oxidized to catechol and possibly to trihydroxybenzene. Phenol and all its derivatives except benzoquinone have been shown to undergo detoxication by conjugation with glucuronide or sulfate, followed by excretion.

A second general pathway involves the further oxidation of benzene oxide to benzene dihydrodiol, which leads to ring-opening and the formation of muconic dialdehyde, a known hematotoxin, primarily in the liver (ATSDR, 1997).

Absorbed benzene is excreted through the lungs as unchanged compound, and through the urinary tract as conjugated metabolites (ATSDR, 1997). Urinary excretion predominates.

Nothing in this review of toxicokinetics suggests that laboratory animals would not serve as appropriate models for the toxicity of benzene to humans.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for benzene and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

As mentioned above, benzene in the liquid and vapor form are absorbed through the skin (ATSDR, 1997). Combining benzene with soil slows dermal uptake. EPA (2004) notes that VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels. Therefore, dermal uptake of benzene from soil is not evaluated. EPA (2004) provides t*, K_p, τ, B and FA values as follows:

Chemical	t*	K_p	τ	FA	B
Benzene	0.70	1.5E-2	0.29	1	0.1
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

Short-term exposure to benzene induces central nervous system (CNS) effects such as drowsiness, dizziness and headaches; long-term exposure may induce anemia (ATSDR, 1997). Oral dosing in animals induces hematopoietic and immune effects. EPA (2011) verified a chronic oral RfD of 4E-3 mg/kg-day, based on hematological effects (reduced lymphocyte count) in a cross-sectional occupational study of 44 workers exposed to benzene. The workers were exposed for 0.7 to 16 years, with a mean of 6.3 years. Because the mean fell below 7 years, the minimal length considered to be chronic, the study is judged to be subchronic in duration. The control group consisted of an equal number of age- and gender-matched unexposed workers. The exposed workers were divided into two equal groups of 22: those exposed to airborne concentrations below and those exposed to airborne concentrations above the median concentration for all workers of 99 mg/m^3. An exposure-adjusted benchmark concentration (BMC) for minimal hematologic effects of 8.2 mg/m^3 was estimated. Assuming that uptake from the respiratory tract is approximately 50 percent of that from the GI tract allowed application of inhalation-to-oral extrapolation to estimate a benchmark dose (BMD) of 1.2 mg/kg-day. Application of an uncertainty factor of 300 to the BMD yielded the verified chronic oral RfD of 4E-3 mg/kg-day. The uncertainty factor of 300 consists of factors of 3 each for extrapolation from a BMC for minimal adverse effects to a BMC for no adverse effects, to expand from subchronic to chronic exposure, and to reflect deficiencies in the data base; a factor of 10 was used to provide additional protection for more sensitive human subpopulations. The blood cells (specifically inhibited hematopoiesis) are the target for prolonged oral exposure to benzene. Confidence in the chronic oral RfD is medium.

A preliminary subchronic oral RfD can be developed from the BMD described above. The subchronic oral RfD is derived by applying an uncertainty factor of 100 to the BMD of 1.2 mg/kg-day. The uncertainty factor of 100 reflects the uncertainty factor of 300 developed by EPA (2011) without the factor of 3 to expand from subchronic to chronic exposure. The preliminary subchronic oral RfD so derived is 1.2E-2 mg/kg-day, which is rounded to 1E-2 mg/kg-day.

A verified chronic inhalation RfC of 3E-2 mg/m^3 for benzene was based on the exposure-adjusted BMC of 8.2 mg/m^3 in the occupational exposure study from which the oral RfD values were derived (EPA, 2011). Application of the uncertainty factor of 300 (as described for the verified chronic oral RfD) to the BMC of 8.2 mg/m^3 yielded the chronic RfC of 3E-2 mg/m^3. The RfC is equivalent to an inhalation RfD of 8.6E-3 mg/kg-day. Confidence in the chronic inhalation RfC is medium. The blood cells (specifically inhibited hematopoiesis) are the target for prolonged inhalation exposure to benzene. A preliminary subchronic inhalation RfC can be derived by application of an uncertainty factor of 100 to the BMC of 8.2 mg/m^3 in the same manner as was done to derive the subchronic oral RfD. The subchronic inhalation RfC so derived is 8.2E-2 mg/m^3, rounded to 8E-2 mg/m^3. The preliminary subchronic inhalation RfC is equivalent to an inhalation RfD of 2.3E-2 mg/kg-day.

6.0 Carcinogenicity Evaluation

Benzene is classified as an EPA cancer weight-of-evidence Group A chemical – a known human carcinogen for all routes of exposure based upon convincing human evidence as well as supporting evidence from animal studies (EPA, 2011). Epidemiologic studies and case studies provide clear evidence of a causal association between exposure to benzene and acute nonlymphocytic leukemia, and also provide supportive evidence for chronic nonlymphocytic leukemia and chronic lymphocytic leukemia. Other neoplastic conditions in humans that are associated with benzene exposure include hematologic neoplasms, blood disorders such as preleukemia and aplastic anemia, Hodgkin's lymphoma, and myelodysplastic syndrome. Experimental animal data add to the weight of evidence that exposure to benzene increases the risk of cancer in multiple species at multiple organ sites (hematopoietic, oral and nasal, liver, forestomach, preputial gland, lung, ovary, and mammary gland). A verified URF range for inhalation exposure of 2.2E-6 to 7.8E-6 per µg/m^3 was based on the incidence of leukemia in humans exposed to benzene while employed in the Pliofilm industry (EPA, 2011). A low-dose linearity model utilizing maximum likelihood estimates was used to estimate the URF. The range reflects differences in the exposure assumptions estimated from the study. EPA (2011) concluded that neither any specific URF value nor either end of the range is more defensible than the other. Therefore, the upper end of the range, 7.8E-6 per µg/m^3, is conservatively selected for this evaluation. The URF of 7.8E-6 per µg/m^3 is equivalent to an inhalation SF of 2.7E-2 per mg/kg/day.

The occupational data that serve as the basis for the inhalation URF also serve as the basis for a verified oral SF for benzene (EPA, 2011). The inhalation URF range was mathematically converted to an equivalent oral SF range by applying standard inhalation rate and body weight assumptions, and by adjusting for route-specific differences in absorption as described for the chronic oral RfD derivation. The oral SF range so derived is 1.5E-2 to 5.5E-2 per mg/kg-day.

The upper end of the range, 5.5E-2 per mg/kg-day, is conservatively selected as the oral SF for this evaluation.

7.0 Toxicity Summary

Toxicity values for benzene are summarized as follows:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
1E-2	4E-3	Bc	8E-2/ 2.3E-2	3E-2/ 8.6E-3	Bc	A	5.5E-2	A	7.8E-6	2.7E-2

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day).
Target organ abbreviations: Bc = blood cells.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1997, ***Update Toxicological Profile for Benzene***, U.S. Department of Health and Human Services, Atlanta, Georgia, September, on line.

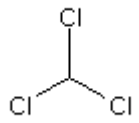
Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line, accessed 21 April.

U.S. Environmental Protection Agency (EPA), 1995, "Final Water Quality Guidance for the Great Lakes System; Final Rule," (40 CFR 9, 122, 123, 131, and 132), ***Federal Register***, 60(56): 15365-15425.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

CHLOROFORM (67-66-3)



1.0 Introduction and Physical Properties

Chloroform is a **VOC** that occurs as a clear, colorless, heavy volatile liquid at ambient temperatures (HSDB, 2011). It occurs naturally in the environment, being made by certain forms of algae, seaweed, and the ecological community in peat bogs. Chloroform has been used as a solvent or extraction solvent, dry cleaning fluid, in fire extinguishers, and as an intermediate in the manufacture of dyes and pesticides (ATSDR, 1997). Major current uses include organic synthesis, particularly fluorocarbon-22. It is also formed in the chlorination of drinking water. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
119.4[b]	1.97[a]	3.67E-3[b] (25°C)	1.60[b]	1.04E-1[b] (25°C)	1.00E-5[b] (25°C)	2.59E-1[c] (25°C)	7.92E+3[b] (20-25°C)	334.32[d]	536.40[d]	6.99E+3[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point of pure liquid compound (°K); T_c = critical temperature (°K);)$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole).
data.
[a]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July.
[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Final, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.
[c]Hazardous Substance Data Bank (HSDB), 2004, National Library of Medicine, on line, accessed 9 January.
[d]U.S. Environmental Protection Agency (EPA), 2003, ***Users Guide for Evaluating Subsurface Vapor Intrusion into Buildings***, Office of Emergency and Remedial Response, Washington, D.C., 19 June.

2.0 Environmental Fate and Transport

Chloroform has been shown to occur naturally in the environment, and its release to the atmosphere from tropical oceans amounts to hundreds of thousands of tons per year (HSDB, 2011). Chloroform also enters the environment associated with its use as an industrial solvent, extractant and chemical intermediate as well as from its inadvertent production in the chlorination of drinking water, municipal sewage and cooling water (ATSDR, 1997; HSDB, 2011). Most environmental releases from industrial uses occur directly to the atmosphere.

Chloroform is expected to exhibit moderate mobility in soil (HSDB, 2011), potentially leaching to groundwater. Volatilization from moist soil surfaces is expected to be an important removal process, given its relatively large Henry's Law constant. Volatilization from dry soil surfaces may also be an important removal process. In one study of chloroform residence time in soils, the compound was found to have a half-life of 0.3 days when applied 1 cm deep into soil, and 1.4 days when applied 10 cm deep. It is classified as a "very short-lived" chemical in soil matrices primarily due to its high volatility. Under normal environmental conditions, chloroform is not

expected to undergo biodegradation in soils, although the compound has been shown to be anaerobically degraded by methanogenic bacteria in the presence of a primary substrate such as acetic acid, and even more readily under sulfate reducing conditions.

Chloroform is not expected to adsorb significantly to sediment or suspended solids in water (HSDB, 2011). Volatilization from water surfaces is expected to be the major process for removing chloroform from surface water. Volatilization half-lives for a model river and model lake have been estimated at 1.3 hours and 4.4 days, respectively. A field study found that the volatilization half-life from the Rhine River was 1.2 days, while in a lake located in the Rhine basin the half-life was 31 days. In another study, chloroform from a municipal treatment plant injected into an estuarine arm of Chesapeake Bay entirely disappeared within 4 km in the spring and within 11 km in the winter under ice. The decrease in concentration could not be attributed entirely to dilution. Based on available experimental data, aquatic degradation is not expected to be a major removal process, although the data are somewhat conflicting. Although base-catalyzed hydrolysis of chloroform is expected to occur, the estimated kinetics predict that this will not be an environmentally important degradation process.

Chloroform is expected to exist solely as a vapor in the ambient atmosphere (HSDB, 2011). Vapor-phase chloroform is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 151 days. Data regarding the potential for other mechanisms to play an important role in chloroform removal were not located. It is likely that wet deposition or washout may occur, but volatilization would probably readily return the compound to the atmosphere. The tropospheric half-life for chloroform has been estimated at 3 years.

The relatively low log K_{ow} value for chloroform suggests that its participation in food-chain pathways is unlikely to be significant (HSDB, 2011). Measured values for BCF, as well as the observation that the compound is rapidly metabolized confirm this suggestion (ATSDR, 1997; HSDB, 2011; EPA, 1995). Therefore, biotransfer factors are not derived for chloroform.

3.0 Toxicokinetics

Several toxicokinetic studies in animals and humans suggest that chloroform is virtually completely absorbed from the GI tract (ATSDR, 1997). Peak blood levels were higher and attained more quickly from an aqueous vehicle than from an oleaginous vehicle. Although several physiological factors (blood/air partition coefficient, ventilation rate, cardiac output, total body weight and fat content) influence the kinetics of uptake from the respiratory tract, generally arterial blood concentrations are directly proportional to the exposure concentration, suggesting that uptake occurs readily, particularly at concentrations below the saturation point. Experiments with humans indicate that dermal uptake of chloroform in water or ethanol readily occurs.

Absorbed chloroform is rapidly and widely distributed throughout the body, readily crossing the blood-brain and placental barriers (ATSDR, 1997). Highest levels are located in tissues with higher fat content, including adipose tissue, nervous system and liver.

Excretion data suggest that chloroform metabolism is quite species-dependent. Following oral dosing with radiolabeled compound, monkeys excreted most of the dose as unchanged compound in expired air, mice excreted most of the dose as carbon dioxide, and rats excreted

both unchanged compound and carbon dioxide (HSDB, 2011). Urinary metabolites included urea (probably formed from carbon dioxide).

The predominant pathway for chloroform metabolism involves the generation of phosgene in the liver, kidney and other tissues as an intermediate in the formation of carbon dioxide (ATSDR, 1997). Phosgene is a toxicant in its own right, combining covalently with microsomal proteins to disrupt cellular integrity and induce necrosis. Humans appear to be less efficient than laboratory rodents in metabolizing chloroform to phosgene, suggesting that a comparable dose might be less toxic to humans. Trihalomethanes as a group are metabolized to carbon monoxide by most species as a result of reductive dechlorination and hydrolysis (ATSDR, 1997; HSDB, 2011). This, however, represents a relatively minor metabolic pathway, and chloroform is somewhat less efficient in forming carbon monoxide than the other trihalomethanes. Carbon monoxide is also toxic, resulting in the formation of carboxyhemoglobin, which is incapable of releasing oxygen to the tissues and transporting carbon dioxide from the tissues.

The routes and kinetics of chloroform excretion depend on the species, percent of body fat, route of exposure and dose. Excretion occurs primarily as carbon dioxide or unchanged compound via exhaled air; minor metabolites are eliminated through the urine and, to a lesser extent, the feces.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for chloroform and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

A hypothetical dermal absorption rate of 29.7 mg/minute was modeled for human hands immersed in liquid chloroform, based on absorption data measured in mice (ATSDR, 1997). Data were not located for dermal uptake from soil. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of chloroform from soil is not evaluated. t*, K_p, τ, FA and B values are provided by EPA (2004) as follows:

Chemical	t*	K_p	τ	FA	B
Chloroform	1.19	6.8E-3	0.50	1.0	0
t* = Time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

Oral or inhalation exposure of animals to chloroform is associated with liver and kidney damage (ACGIH, 1991; ATSDR, 1997; EPA, 2011). The case for kidney effects associated with prolonged oral exposure in humans, however, is equivocal. In humans, acute inhalation exposure to high levels induces narcosis, ventricular fibrillation and death (ACGIH, 1991). Limited occupational data associate chronic exposure to chloroform with CNS depression, digestive disturbances and enlarged livers, but not with olfactory epithelial involvement, which has been seen in laboratory animals.

Chloroform has been the subject of continued investigation and reevaluation because of its nearly ubiquitous nature as an anthropogenic chemical and the potential for widespread exposure. An earlier EPA (2004b) evaluation derived a chronic oral RfD of 1E-2 mg/kg-day based on a LOAEL for fatty cyst formation in the livers and biochemical evidence of liver damage in a 1979 study in which dogs were treated orally for 7.5 years. An uncertainty factor of 1000 was applied. In this dog study, the chemical was given orally in a toothpaste base in gelatin capsules in an effort to test the long-term effects of chloroform in toothpaste. Confidence in this earlier oral RfD was medium to low. The liver was considered the target organ for chronic oral exposure to chloroform.

Other studies analyzed in a recent reevaluation include a 1995 drinking water study in mice, a 1995 gavage study in rats, and a 2000 drinking water study in rats. Subtle effects on the kidney appear to be the critical effects of prolonged exposure in rodents. The liver lesions in the 1979 dog study remain the more sensitive endpoint of chloroform exposure and the more appropriate basis for an oral RfD. EPA (2011) developed a benchmark dose limit associated with a 10 percent extra risk for the liver lesions and biochemical evidence described above ($BMDL_{10}$) of 1.2 mg/kg-day. Application of an uncertainty factor of 100 and rounding to one significant figure yields the more recently verified oral RfD of 1E-2 mg/kg-day. The uncertainty factor of 100 consists of factors of 10 each for inter- and intra-species variation. Confidence in the new oral RfD is medium; slightly higher than the level of confidence in the earlier derivation because the BMDL approach is considered somewhat more reliable than the LOAEL/NOAEL approach to RfD development. The rodent studies provide sufficient information to identify both the liver and the kidney as target organs for prolonged oral exposure to chloroform.

Previously, EPA (1997a) adopted the earlier chronic oral RfD of 1E-2 mg/kg-day as the provisional RfD for subchronic oral exposure. As noted above, the earlier chronic oral RfD derivation has been revised, although the value of the RfD remains the same. Therefore, the new verified chronic oral RfD of 1E-2 mg/kg-day is adopted as sufficiently protective for subchronic exposure, but EPA (1997a) is no longer cited as the source.

Prolonged inhalation exposure of rats is associated with atrophy of the ethmoid epithelium at concentrations lower than those associated with liver or kidney effects (EPA, 1997b, 2003). An earlier provisional subchronic inhalation RfC was derived from a 13-week intermittent exposure study in rats based on effects on the ethmoid epithelium. More recently, EPA (2003) determined that atrophy of the nasal epithelium in rats is not an appropriate model for human toxicity, in part because this effect has not been observed in humans. The effects on the liver and kidney appear consistently to be the critical effects in humans following inhalation or oral exposure. Subchronic studies in rats and mice showed that mice were somewhat more sensitive than rats to these effects.

A large study of B6C3F1 strain mice was conducted in which groups of 15 mice of each sex were exposed to chloroform in air at concentrations of 0 (control), 0.3, 2, 10, 30 or 90 ppm on 6 hours per day, 7 days per week, for a total of 13 weeks (EPA, 2003). Other groups of 13 to 15 mice of each sex were exposed to 10 or 90 ppm 6 hours per day, 5 days per week, for a total of 13 weeks to see if there were differences between exposure on 5 or 7 days per week in the intensity of the response. Still other groups of 5 to 13 female mice were exposed to 0, 0.3, 2, 10, 30 or 90 ppm on 6 hours per day for 4, 21 or 42 continuous days to investigate the time-course

development of chloroform-induced liver lesions. Finally, groups of 8 mice of each sex were exposed to 30 or 90 ppm 6 hours per day for 6 weeks followed by a 6-week recovery period in which they were held without exposure, to test the reversibility of the liver and kidney effects.

Kidney lesions were observed only in the male mice exposed to 30 or 90 ppm chloroform (EPA, 2003). There appeared to be little difference between mice exposed on 5 days per week and those exposed for 7 days per week. The kidney lesions did not appear to be reversible, at least during the 6-week recovery period afforded certain groups. Liver lesions were observed in both male and female mice exposed to 30 or 90 ppm chloroform. Severity was greater in those exposed on 7 days per week compared with those exposed on 5 days per week. The liver lesions appeared to be largely reversible during the 6-week recovery period. This study identified 10 ppm as the NOAEL and 30 ppm as the LOAEL for liver and kidney effects in mice. However, a "labeling index" was slightly increased in the kidneys of male mice exposed to 10 ppm. The labeling index suggests that chloroform metabolites may have bound to macromolecules in the kidney cells at levels below those with discernable pathological change. A smaller study in BDF1 mice identified 5 ppm as a NOAEL and 30 ppm as the LOAEL for kidney and liver effects in a second strain of mice.

EPA (2003) chose the 5 ppm NOAEL in mice described above as the basis for developing subchronic and chronic RfCs for chloroform. The 5 ppm concentration, equivalent to 25 mg/m^3, was adjusted to a human equivalent concentration for continuous exposure of 4.5 mg/m^3. Application of an uncertainty factor of 100 yields a provisional inhalation RfC, rounded to one significant figure, of 5E-2 mg/m^3. The uncertainty factor consists of a factor of 10 to provide additional protection to unusually sensitive members of the population, and factors of 3 each to account for physiological differences between mice and humans, and to reflect uncertainty about the data base. The major uncertainty surrounds the potential for neurological effects to occur at levels lower than the NOAEL for kidney and liver effects. The provisional RfC is equivalent to 1.4E-2 mg/kg-day. The provisional RfC is appropriate for either subchronic or chronic exposure, because the large study in B6C3F1 mice did not indicate increased incidence or severity of effects with increased duration of exposure. The liver and kidney are the target organs for prolonged inhalation exposure to chloroform. Confidence in the RfC is low to medium.

6.0 Carcinogenicity Evaluation

The carcinogenicity of chloroform has recent undergone reevaluation and updating on the IRIS record (EPA, 2011). Chloroform was formerly classified as a cancer weight-of-evidence Group B2 compound (probable human carcinogen), based on increased incidence of several tumor types in rats and liver tumors in mice. Human carcinogenicity data are inadequate. A verified oral SF of 6.1E-3 per mg/kg-day was derived from the incidence of kidney tumors in rats treated with chloroform in drinking water for two years. A verified inhalation URF of 2.3E-5 per ug/m^3, developed in 1987, was based on the incidence of hepatocellular carcinomas in mice treated by gavage for 78 weeks. The inhalation URF is equivalent to 8.1E-2 per mg/kg-day.

The more recent cancer evaluation describes chloroform *as likely to be carcinogenic to humans by all routes of exposure under high-exposure conditions that lead to cytotoxicity and regenerative hyperplasia in susceptible tissues (i.e., liver and kidney)* (EPA, 2011). On the other hand, chloroform is unlikely to be carcinogenic to humans by any route of exposure under exposure conditions that do not cause cytotoxicity and cell regeneration. Chloroform appears to

exert its carcinogenicity through epigenetic mechanism(s) that are inoperative unless cellular damage in susceptible tissues is sufficient to result in cell regeneration. Since there are thresholds for cytotoxicity, the carcinogenic expression of chloroform is generally assessed as a threshold phenomenon. In other words, the chronic oral RfD of 1E-2 mg/kg-day is considered to be sufficiently protective against carcinogenicity by oral or dermal exposure, and the inhalation RfC of 5E-2 mg/m^3 (1.4E-2 mg/kg-day) is considered to be sufficiently protective against carcinogenicity for inhalation exposure. It should be noted that the previously verified oral SF has been removed from the IRIS record. The previously verified inhalation URF still appears on the IRIS record, but it is preceded by the caveat that it is based on a 1987 evaluation and does not incorporate newer data or reflect updated cancer assessment guidelines. The inhalation carcinogenicity assessment is currently under revision (EPA, 2011).

In most cases it is not necessary to evaluate the carcinogenicity of chloroform using either the oral or inhalation SFs described above, because the noncancer effects would drive decision-making. In fact, it would be inappropriate to base selection of chloroform as a chemical of concern, or to develop remedial goal options for chloroform, based on cancer risk. However, it may be useful to estimate the cancer risk associated with chloroform for the baseline condition. This could be done using the oral and inhalation SFs described above, but it should only be done if the route-specific exposure dose on a daily basis exceeds the route-specific RfD.

7.0 Toxicity Summary

Toxicity values for chloroform are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfc/ sRfD	cRfC/ cRfD	TO	WOE	SFo	WOE	URFi	SFi
1E-2	1E-2	L, K	5E-2/ 1.4E-2	5E-2/ 1.4E-2	L, K	See Section 6	ND[b]	See Section 6	ND[b]	ND[b]

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data.
Target organ abbreviations: L = liver; K = kidney.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.
[b]Chloroform is determined to be a threshold carcinogen more appropriately evaluated by the RfD and RfC values derived for protection against threshold phenomena.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1997, ***Update Toxicological Profile for Chloroform***, U.S. Department of Health and Human Services, Atlanta, Georgia, September.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, ACGIH, Cincinnati, Ohio, pp. 289-291.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line, accessed 9 January.

U.S. Environmental Protection Agency (EPA), 1995, "Final Water Quality Guidance for the Great Lakes System; Final Rule," (40 CFR 9, 122, 123, 131, and 132), ***Federal Register***, 60(56): 15365-15425.

U.S. Environmental Protection Agency (EPA), 1997a, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, PB97-921199, July.

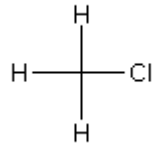
U.S. Environmental Protection Agency (EPA), 1997b, ***Risk Assessment Issue Paper for: Derivation of Provisional Subchronic and Chronic RfCs for Chloroform (CASRN 67-66-3)***, National Center for Environmental Assessment, Cincinnati, Ohio, 1 December.

U.S. Environmental Protection Agency (EPA), 2003, ***Risk Assessment Issue Paper for: Derivation of Provisional Subchronic and Chronic RfCs for Chloroform (CASRN 67-66-3)***, National Center for Environmental Assessment, Cincinnati, Ohio, 22 January.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*** Final, Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

CHLOROMETHANE (METHYL CHLORIDE) (74-87-3)



1.0 Introduction and Physical Properties

Chloromethane is a **VOC** that exists as a colorless gas at ambient temperatures (HSDB, 2011). It is used largely as a methylating agent in the production of silicones, tetramethyl lead, methyl cellulose, methylene chloride, methyl mercaptan, plastics, pesticides, pharmaceuticals, dyes, perfumes, ethers, resins, agricultural chemicals, quaternary amines and butyl rubber (ACGIH, 1991; ATSDR, 1998; HSDB, 2011). It is also used as an extractant for fats, oils and resins, as a blowing agent and as a refrigerant. It was formerly used as a propellant in various aerosol products. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
50.5[a]	0.91[a]	8.82E-3[b] (25□C)	1.15[b]	1.39E-1[c] (25□C)[d]	1.49E-5[e] (20□C)	5.66E+0[b] (25□C)	5.32E+3[b] (25 □C)	247[f]	416[f]	5.15E+3[f]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);,.$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole).

[a]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

[b]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

[c]Calculated as described in Introduction to Toxicological profiles.

[d]Assumed.

[e]Montgomery, J.H., 1996, ***Groundwater Chemicals Desk Reference, Second Edition***, Lewis Publishers, New York, pp. 664-666.

[f]National Institute of Standards and Technology (NIST), 2011, ***NIST Chemistry WebBook***, on line.

2.0 Environmental Fate and Transport

Chloromethane is one of the few halogenated organic chemicals for which natural sources are significant. Natural sources include volcanoes, volatilization from plants, and forest fires (HSDB, 2011). It is produced in seawater by the reaction of methyl iodide with chloride ions. Methyl iodide is produced photosynthetically by several marine organisms, and there may be other oceanic sources as well. The mean air flux of 1.3E-6 g/cm^2-year for the eastern Pacific Ocean, when extrapolated to global waters, provides an adequate source to explain the atmospheric reservoir of chloromethane. Chloromethane is released from brush and forest fires. The estimated 0.6 g of chloromethane released per kg of vegetation burned is believed to make a significant impact on the global burden of the compound.

The production and many uses of chloromethane may result in its release to the environment through various waste streams (HSDB, 2011). It is also released in tobacco smoke and turbine exhaust. Just as forest fires contribute to natural sources, wood burning, field burning, and backyard burning also contribute to atmospheric burdens. Chloromethane is formed in the chlorination of drinking water and sewage effluent, and is found in the effluent of some publically owned treatment works.

Most chloromethane is released to the atmosphere where it is expected to exist solely as a gas (HSDB, 2011). Gas-phase chloromethane is degraded in the atmosphere by reaction with

photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 310 days, which provides opportunity for widespread dispersion. The dominant process for removal from the troposphere is upward diffusion, although washout by rain may also be important. From the tropopause to about 30 km, both upward diffusion and reaction with hydroxyl radicals will be of approximately equal importance, and above 30 km in the stratosphere, diffusion, reaction with hydroxyl radicals, and photodissociation will have approximately equal importance. The surface half-life resulting from upward diffusion is approximately 80 days.

Based on its very low estimated K_{oc} value, chloromethane is expected to have very high mobility in soil (HSDB, 2011). Its relatively high water solubility suggests the compound released in sufficient quantity in the liquid phase or dissolved in water could leach readily to groundwater. Volatilization from moist soil surfaces is expected to be an important removal process for small quantities released to the surface. Volatilization from dry soil surfaces may also be important. Field and laboratory studies demonstrate that several halogenated aliphatics may biodegrade slowly under anaerobic conditions, but not under aerobic conditions. Biodegradation is not expected to be a significant removal process.

Chloromethane is not expected to adsorb to suspended solids and sediment in surface water (HSDB, 2011). Volatilization from water surfaces is expected to be a significant removal mechanism; volatilization half-lives for a model river and model lake are 46 minutes and 3 days, respectively. Field and laboratory studies demonstrate that several halogenated aliphatics may biodegrade slowly under anaerobic conditions, but not under aerobic conditions. Biodegradation is not expected to be a significant removal process. Hydrolysis may occur, but very slowly, with a half-life of approximately 2 years (ATSDR, 1998). Hydrolysis will not be a significant removal process for chloromethane in surface water, but may be the only significant removal process for the compound in groundwater, where it has been shown to persist.

Chloromethane is water soluble, volatile and labile, and is not expected to participate significantly in food-chain pathways (ATSDR, 1998; HSDB, 2011). Therefore, biotransfer factors are not estimated for this compound.

3.0 Toxicokinetics

Studies regarding the toxicokinetics of chloromethane are limited to inhalation exposure. Chloromethane is readily absorbed by the respiratory system and equilibrium conditions are reached in approximately one hour in exposed humans and laboratory animals (ATSDR, 1998). Data regarding the extent of respiratory absorption were not located. Although data were not located for GI absorption, it is expected that GI absorption would be rapid and extensive because the compound is a low MW organic substance that is readily absorbed by the respiratory system. HSDB (2011) stated that dermal absorption can occur, but no other information was provided.

Radioactivity is rapidly and extensively distributed throughout the body following inhalation exposure to radiolabeled chloromethane, with highest levels of radioactivity measured in liver, kidney, testis and lung (ATSDR, 1998). Approximately 20 percent of the radiolabel in liver and testis was found to have been metabolically incorporated into the cellular structure, reflecting uptake and utilization from the one-carbon atom pool of the body.

The primary and predominant metabolic pathway of chloromethane involves enzymatic conjugation with glutathione to form S-methylglutathione (ATSDR, 1998). Further metabolism involves deamination to yield S-methylcysteine and other sulfur-containing conjugation derivatives, which are excreted in the urine. Another metabolic pathway involves dehalogenation of chloromethane to form formaldehyde (a toxicant in its own right) and formic acid. These intermediates contribute to the one-carbon atom pool that is available for incorporation into the tissues or for mineralization to carbon dioxide followed by excretion through the lungs.

Studies have shown that adult humans, unlike laboratory animals, may be divided into two groups – fast or slow metabolizers – depending on the activity in their erythrocytes of glutathione-S-transferase, which is responsible for the first conjugation reaction (ATSDR, 1998). Fast metabolizers clear chloromethane from the body more rapidly than slow metabolizers. Whether the unborn, new born or young children exhibit this characteristic is unknown. The implications of glutathione-S-transferase activity regarding population differences in toxic potency are unclear. On the one hand, it may appear that fast metabolizers should be more tolerant of chloromethane because of their enhanced ability to clear the compound from the body. On the other hand, experiments in laboratory animals suggest that a metabolite of S-methylglutathione may be the ultimate toxicant, in which case fast metabolizers may be more sensitive to chloromethane toxicity.

Chloromethane residues are rapidly cleared from the body following the cessation of inhalation exposure (ATSDR, 1998). Clearance in laboratory animals and humans is biphasic, consistent with a linear 2-compartment model. The half-lives for both phases were measured in minutes, indicating the rapidity with which clearance occurs. The exception is that the β-phase in some humans (slow metabolizers) approximated 1.5 hours.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Chloromethane is assumed to be absorbed readily from the GI tract; therefore, no GAF is developed.

Data regarding the dermal uptake of chloromethane were not located, except that HSDB (2011) stated that dermal absorption could occur. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of chloromethane from soil is not quantified. EPA (2004) provides t*, K_p, τ, FA and B values as follows:

Chemical	t*	K_p	τ	FA	B
Chloromethane	0.49	3.3E-3	0.20	1	0
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

Data regarding the toxicity of oral exposure to chloromethane consist of the statement that liver effects were not observed in rats given a single oral dose of 420 mg/kg (ATSDR, 1998; EPA, no date). EPA (no date) derived a provisional chronic oral RfD of 4E-3 mg/kg-day based on a LOAEL of 69.32 mg/m^3 for subtle neurobehavioral effects from an occupational (inhalation) study. Subsequently, EPA (2011) reviewed the data and determined that ingestion exposure is not applicable because the compound exists as a gas at ambient temperatures. They also noted that the oral exposure data are insufficient to develop an oral RfD. Therefore, the EPA (no date) derivation is considered to be not applicable and no oral RfD is offered herein.

EPA (2011) verified a chronic inhalation RfC of 9E-2 mg/m^3 based on a NOAEL of 50 ppm (103.2 mg/m^3) from an 11-day continuous exposure study in mice. The NOAEL corresponds to a human equivalent concentration (HEC) of 94.6 mg/m^3. The LOAEL in this study, 100 ppm (206.4 mg/m^3 or a HEC of 189.2 mg/m^3) was associated with slight to moderate degenerative changes in the granule cells of the cerebellum. EPA (2011) applied an uncertainty factor of 1000 to the NOAEL HEC of 94.6 mg/m^3 to derive the RfC of 9E-2 mg/m^3. The uncertainty factor consists of factors of 10 each to provide additional protection for unusually sensitive humans and to expand from a short-term to lifetime exposure, and factors of 3 each to extrapolate from mice to humans and to address the uncertainty regarding the potential for CNS effects in the developing young. Confidence in the verified chronic inhalation RfC is medium. The verified inhalation RfC is equivalent to an inhalation RfD of 2.6E-2 mg/kg-day. The CNS is the target organ for prolonged inhalation exposure to chloromethane.

EPA (1996) developed a provisional chronic RfC based on subtle neurobehavioral effects from an occupational (inhalation) study. They adopted the provisional chronic RfC for subchronic application, noting no significant differences in response between chronic and subchronic exposure. However, given the EPA (2011) reevaluation and verification of a more conservative chronic RfC, it is deemed prudent to adopt the verified chronic RfC rather than the provisional chronic RfC as sufficiently protective for subchronic exposure.

6.0 Carcinogenicity Evaluation

Previous EPA (1997, 1998) evaluations classified chloromethane in EPA weight-of-cancer Group C (possible human carcinogen), and developed an oral SF and an inhalation URF. More recently, EPA (2011) reevaluated the data, noting that chloromethane is a naturally occurring compound, and concluded that it is more appropriately classified in Group D (not classifiable as to its human carcinogenicity). Applying more recent cancer assessment guidelines, EPA (2011) concluded that the available data suggest that chloromethane would be classified as an agent whose carcinogenic potential *cannot be determined*. Previously developed potency factors are considered to be not applicable; no potency factors are offered herein for chloromethane.

7.0 Toxicity Summary

Toxicity values for chloromethane are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
ND	ND	NA	9E-2/ 2.6E-2	9E-2/ 2.6E-2	CNS	D	NA	D	NA	NA

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data; NA = not applicable.
Target organ or critical effect abbreviations: CNS = central nervous system.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1998, ***Update Toxicological Profile for Chloromethane***, U.S. Department of Health and Human Services, Atlanta, Georgia, December, on line.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, Cincinnati, Ohio, pp. 953-957.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

U.S. Environmental Protection Agency (EPA), no date, ***Risk Assessment Issue Paper for: Derivation of a Provisional RfD for Chloromethane (CASRN 74-87-3)***, National Center for Environmental Assessment, Cincinnati, Ohio.

U.S. Environmental Protection Agency (EPA), 1996, ***Risk Assessment Issue Paper for: Derivation of a Provisional Chronic and Subchronic RfC for Chloromethane (CASRN 74-87-3)***, National Center for Environmental Assessment, Cincinnati, Ohio, 23 July.

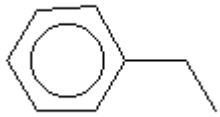
U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, Washington, D.C., 9200.6-303(97-1), EPA 540/R-97-036, PB97-921199.

U.S. Environmental Protection Agency (EPA), 1998, ***Draft Risk Assessment Issue Paper for: Updating the Quantitative Carcinogenicity Evaluation of Chloromethane (CASRN 74-87-3)***, National Center for Environmental Assessment, Cincinnati, Ohio, 18 December.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*** Final, Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

ETHYLBENZENE (PHENYLETHANE) (100-41-4)



1.0 Introduction and Physical Properties

Ethylbenzene, also known as phenylethane, is a **VOC** that exists in the pure state as a colorless liquid at ambient temperatures (HSDB, 2011). It is used primarily as a precursor in the manufacture of styrene (ATSDR, 1999). It is also used as a solvent and diluent, and as an intermediate in the manufacturing of cellulose acetate, rubber and other organic compounds (ATSDR, 1999; HSDB, 2011). It is also a constituent of asphalt, naphtha, and automotive and aviation fuels. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
106.2[a]	3.15[a]	7.88E-3[b] (25°C)	2.56[b]	7.50E-2[b] (25°C)	7.80E-6[b] (25°C)	1.26E-2[c] (25°C)	1.69E+2[b] (20-25°C)	409.34[d]	617.20[d]	8.50E+3[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K); $H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole).
[a]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July.
[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.
[c]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.
[d]U.S. Environmental Protection Agency (EPA), 2003, ***User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings***, Office of Emergency and Remedial Response, Washington, D.C., June 19.

2.0 Environmental Fate and Transport

Ethylbenzene enters the atmosphere primarily from fugitive emissions and exhaust connected with its use in gasoline (ATSDR, 1999; HSDB, 2011). More localized sources to the air and other environmental media include fugitive emissions, waste water and spills from its production and industrial use, leaking underground storage tanks, land disposal of ethylbenzene-containing waste, and municipal and hazardous waste combustion.

Ethylbenzene exists in the air in the vapor phase (ATSDR, 1999; HSDB, 2011). It is somewhat water soluble and may be removed by precipitation; however, it is likely to reenter the air by volatilization. Ethylbenzene is transformed in air by various oxidative processes to yield ethylphenols, benzaldehyde, acetophenone, and m- and p-nitroethylbenzene. Reaction with photolytically generated hydroxyl radicals is probably the most significant reaction, with a half-life estimated to be 55 hours, suggesting that ethylbenzene will not persist in the air or travel long distances.

Ethylbenzene released to soil will volatilize rapidly (ATSDR, 1999; HSDB, 2011). That which infiltrates is expected to be quite mobile in soil and may leach to groundwater because sorption to soil particles is not sufficiently strong to retard movement. Biodegradation in soil in aerobic conditions involves oxidation of the ethyl side chain, ring hydroxylation and ring cleavage, and may be a significant source of removal. Anaerobic degradation is expected to be insignificant.

Ethylbenzene released to surface water will volatilize rapidly to air (ATSDR, 1999; HSDB, 2011). Biodegradation in aerobic conditions will significantly reduce water-borne concentrations. Photolysis and hydrolysis are unlikely to be significant. Ethylbenzene partitions weakly to sediment.

Ethylbenzene is not expected to participate significantly in food-chain pathways (ATSDR, 1999; EPA, 1995; HSDB, 2011); therefore, biotransfer factors are not provided.

3.0 Toxicokinetics

Ethylbenzene is rapidly absorbed during inhalation exposure, with retention near or exceeding 50 percent of the inhaled concentration (ATSDR, 1999). The compound is similarly rapidly absorbed following oral administration. Excretion data in rabbits suggest that a minimum of 72 to 92 of an oral dose is absorbed. Liquid ethylbenzene applied to the skin of humans is rapidly absorbed, but ethylbenzene vapor is poorly absorbed.

Ethylbenzene appears to be efficiently and widely distributed throughout the body following inhalation exposure (ATSDR, 1999). The same is expected following oral and dermal exposure, but data are lacking.

Metabolism in humans of absorbed ethylbenzene following either inhalation or oral exposure predominantly involves successive oxidation of the ethyl side-chain through 1-phenylethanol, acetophenone, ω-hydroxyacetophenone, and 1-phenyl-1,2-ethanediol to form mandelic acid and phenylglyoxylic acid (ATSDR, 1999). Small quantities of the first 4 intermediates are conjugated and excreted in the urine. Mandelic acid and phenylglyoxylic acid are excreted without conjugation and comprise the majority of excreted metabolites. A minor metabolic pathway involves epoxide formation and hydroxylation of the phenyl ring with or without oxidation of the ethyl group to yield small quantities of metabolites that are conjugated and excreted. Experiments with laboratory animals reveal species differences in the predominance of certain metabolites, but the pathways described above appear to hold. There is no evidence that the metabolites are more toxic than the parent compound.

Excretion of metabolites, primarily through the urine, is rapid and extensive in humans and laboratory animals (ATSDR, 1999). Pulmonary excretion of carbon dioxide is a minor pathway.

Nothing in this review of toxicokinetics suggests that laboratory animals would not serve as appropriate models for the toxicity of ethylbenzene to humans.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. GI absorption of ethylbenzene is extensive as discussed in Section 3.0. Therefore, no GAF is developed for ethylbenzene and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Data were not located for dermal uptake of ethylbenzene from soil. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels

(EPA, 2004). Therefore, dermal uptake of ethylbenzene from soil is not evaluated. Values for t*, K_p, τ, FA and B are provided by EPA (2004) as follows:

Chemical	t*	K_p	τ	FA	B
Ethylbenzene	1.01	4.9E-2	0.42	1.0	0.2
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

An oral LD_{50} in rats of 5.46 g/kg (HSDB, 2011) suggests that the acute toxicity of ingested ethylbenzene is low. Subchronic to chronic oral exposure of laboratory animals to ethylbenzene induces mild liver and kidney lesions (EPA, 2011). EPA (2011) presents a verified chronic oral RfD for ethylbenzene of 1E-1 mg/kg-day based on a NOEL for liver and kidney lesions in female rats of 136 mg/kg-day in a six-month gavage study. The LOAEL in this study was 408 mg/kg-day. An uncertainty factor of 1000 was applied to the NOEL to derive the chronic oral RfD. The uncertainty factor consists of factors of 10 each to extrapolate from animals to humans, to provide additional protection for more sensitive humans, and to expand from subchronic to chronic exposure. Confidence in the oral RfD is low. The liver and kidney are the target organs for prolonged oral exposure to ethylbenzene.

No EPA-derived subchronic oral RfD is available for ethylbenzene. A preliminary subchronic oral RfD can be made, however, by applying an uncertainty factor of 100 to the NOEL of 136 mg/kg-day in the 6-month rat study described above. The uncertainty factor of 100 reflects the chronic uncertainty factor of 1000 without the factor of 10 for expansion from subchronic to chronic exposure. The preliminary subchronic oral RfD so derived is 1E+0 mg/kg-day.

Acute inhalation exposure induces irritation of the mucous membranes in animals and humans (ACGIH, 1991). Prolonged inhalation exposure induces liver enzymes and results in elevated liver and kidney weights; prolonged exposure to relatively high levels is associated with mild histopathological lesions of the liver, kidney and testes (ACGIH, 1991; EPA, 2011). EPA (2011) considered that the effects on the liver at the lower exposure concentrations are adaptive rather than adverse. EPA (2011) presented a verified chronic inhalation RfC of 1E+0 mg/m^3 derived from a human equivalent adjusted NOAEL of 434 mg/m^3 from studies on developmental effects in rats and rabbits. An uncertainty factor of 300 was used. The human equivalent adjusted LOAEL of 4340 mg/m^3 was associated with equivocal evidence of reduced fetal size in rabbits, an increased incidence of extra ribs in rat fetuses, and increased liver, kidney and spleen weights in the rats. The inhalation RfC is equivalent to 2.9E-1 mg/kg-day. Confidence in the RfC is low. The chronic inhalation RfC is adopted as being sufficiently conservative for subchronic as well as chronic inhalation exposure.

The key study from which the inhalation RfC is derived does not clearly identify target organ(s) for inhalation exposure to ethylbenzene. The entire inhalation exposure data base, however, suggests that the liver, kidneys and fetus may be the most significant target organs for prolonged inhalation exposure.

6.0 Carcinogenicity Evaluation

Ethylbenzene is currently verified as a cancer weight-of-evidence Group D compound (not classifiable as carcinogenicity to humans) (EPA, 2011) based on an absence of human or animal cancer studies. Cancer potency factors are not estimated for Group D compounds.

7.0 Toxicity Summary

Toxicity values for ethylbenzene are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
1E+0	1E-1	L, K	1E+0/ 2.9E-1	1E+0/ 2.9E-1	L, K, F	D	NA	D	NA	NA

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); NA = not applicable.
Target organ or critical effect abbreviations: L = liver; K = kidney; F = fetus.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 1999, ***Update Toxicological Profile for Ethylbenzene***, U.S. Department of Health and Human Services, Atlanta, Georgia, July, on line.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, Cincinnati, Ohio, p. 581-584.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

U.S. Environmental Protection Agency (EPA), 1995, "Final Water Quality Guidance for the Great Lakes System; Final Rule," (40 CFR 9, 122, 123, 131, and 132), ***Federal Register***, 60(56): 15365-15425.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*** Final, Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

METHYLENE CHLORIDE (DICHLOROMETHANE) (75-09-2)

1.0 Introduction and Physical Properties

Methylene chloride is a **VOC** used predominantly as a paint remover and as a solvent and flammability depressant in aerosol products such as coatings, paint removers, hair sprays, room deodorants, herbicides and insecticides (ATSDR, 2000; HSDB, 2011). Methylene chloride is also used in the foam blowing of polyurethanes, in metal degreasing, stripping and degreasing of electronic components, in resin production, photographic film splicing, adhesive production, and other solvent, cleaning and thinning applications. It occurs as a colorless liquid at ambient temperatures. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
84.9[a]	1.25[a]	3.25E-3[e] (25EC)	1.07[b]	1.01E-1[b] (25EC)	1.17E-5[b] (25EC)	5.72E-1[c] (25EC)	1.30E+4[b] (20-25EC)	313.0[d]	510.0[d]	6.71E+3[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry□s Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point of pure liquid compound (EK); T_c = critical temperature (EK); $\Delta H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); ND = no data.[a]U.S U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Final, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.
[c]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.
[d] U.S. Environmental Protection Agency (EPA), 1997, ***User□s Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings***, prepared by Environmental Quality Management, Inc. for the Office of Emergency and Remedial Response, Washington, D.C., September.
[e]U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*.

2.0 Environmental Fate and Transport

Methylene chloride is highly volatile; therefore, most environmental releases are to the atmosphere (ATSDR, 2000; HSDB, 2011). Large amounts (greater than a hundred million pounds) are released each year during its industrial and consumer use. Methylene chloride exists solely as a vapor in air and may travel long distances before removal. It is subject to reaction with photochemically generated hydroxyl radicals with a half-life of a few months. It is also subject to direct photolysis.

Methylene chloride released to soil will be highly mobile and will infiltrate or leach to greater depths or to groundwater (ATSDR, 2000; HSDB, 2011). Some will also volatilize. Methylene chloride released to water will be rapidly lost primarily by volatilization. It is not expected to partition to sediment. It is subject to hydrolysis and biodegradation, but these processes are less significant than volatilization. Methylene chloride is not expected to participate significantly in food-chain pathways; therefore, biotransfer factors are not provided.

3.0 Data for Evaluating Dermal Exposure

Animal studies indicate that methylene chloride is readily absorbed from the GI tract (ATSDR, 2000). EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for methylene chloride and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of methylene chloride from soil is not evaluated. K_p, τ, FA and B values are provided by EPA (2004) as follows:

Chemical	K_p	τ	FA	B
Methylene chloride	3.5E-3	0.32	1.0	0

K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).

4.0 Noncancer Effects Evaluation

Oral LD_{50} values in rats and mice approximate 2 g/kg, suggesting that the acute toxicity of methylene chloride is moderate (ATSDR, 2000). Prolonged oral exposure induces liver lesions in laboratory animals. EPA (2011) verified an RfD for chronic oral exposure of 6E-2 mg/kg-day by applying an uncertainty factor of 100 to a NOAEL of about 6 mg/kg-day in a two-year drinking water study in rats. The LOAEL, about 55 mg/kg-day, was associated with histopathologic lesions in the liver. Confidence in the RfD is medium. EPA (1997) adopted the verified chronic oral RfD of 6E-2 mg/kg-day as the provisional RfD for subchronic oral exposure.

Occupational exposure to high concentrations of methylene chloride is associated with a wide variety of neurological dysfunctions and elevated blood levels of carbon monoxide (a metabolite of methylene chloride) and carboxyhemoglobin (ACGIH, 1991). Chronic inhalation exposure of laboratory animals induces liver effects. EPA (1997) derived a provisional chronic inhalation RfC of 3E+0 mg/m^3 based on a NOAEL of 695 mg/m^3 in a two-year intermittent exposure study in rats. ATSDR (2000) lists a chronic inhalation minimum risk level (MRL) of 0.3 ppm. A concentration analogous to an RfC can be calculated if this MRL is multiplied by the ratio of the molecular weight of methylene chloride (84.9) to the average molecular weight of air (~29). This result in an "RfC" of 9E-1 mg/m^3. This is equivalent to an inhalation RfC of 0.3 mg/kg-day. The values are also used for subchronic exposure.

5.0 Carcinogenicity Evaluation

Methylene chloride is classified in EPA cancer weight-of-evidence Group B2 (probable human carcinogen), based on inadequate human data and sufficient evidence of carcinogenicity in animals (EPA, 2011). Animal inhalation studies showed increased incidence of hepatocellular neoplasms and alveolar/bronchiolar neoplasms in male and female mice, mammary tumors in rats of either sex, salivary gland sarcomas in male rats and leukemia in female rats. Oral studies were inconclusive. An oral SF of 7.5E-3 per mg/kg-day was based on the incidence of liver tumors in two inhalation studies in mice. An inhalation URF of 4.7E-7 per μg/m^3 was based on

the incidence of liver and lung tumors in one inhalation study. The inhalation URF is equivalent to 1.6E-3 per mg/kg-day.

6.0 Toxicity Summary

Toxicity values for methylene chloride are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
6E-2	6E-2	L	9E-1/ 3E-1	9E-1/ 3E-1	L	B2	7.5E-3	B2	4.7E-7	1.6E-3

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URF = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data.
Target organ abbreviations: L = liver; K = kidney; NA = not applicable.
[a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.

7.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Methylene Chloride***, U.S. Department of Health and Human Services, Atlanta, Georgia, September, on line.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, ACGIH, Cincinnati, Ohio, pp. 981-987.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line, accessed 7 February.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, NTIS No. PB97-921199.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

1,1,2,2-TETRACHLOROETHANE (79-34-5)

1.0 Introduction and Physical Properties

1,1,2,2-Tetrachloroethane is a **VOC** that exists in the pure state as a colorless to pale yellow liquid at ambient temperatures (HSDB, 2011). It was once used as a non-flammable solvent in cleaning and degreasing metals, in paint removers, varnishes and lacquers, in photographic film, as an extractant for oils and fats, and as an intermediate in the synthesis of unsaturated chlorinated solvents (ATSDR, 2008; HSDB, 2011). All these uses have declined markedly. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
167.9[a]	2.39[a]	3.67E-4[e] (25 °C)	1.97[b]	7.10E-2[b] (25 °C)	7.90E-6[b] (25 °C)	8.03E-3[c] (25 °C)	297E+3[b] (20-25 °C)	419.60[d]	661.15[d]	9.00E+3[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry□s Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point of pure liquid compound (°K); T_c = critical temperature (°K); $\Delta H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole).

[a]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Fianl, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

[c]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

[d]U.S. Environmental Protection Agency (EPA), 1997, ***User□s Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings***, Office of Emergency and Remedial Response, Washington, D.C., September.

[e]U.S. Environmental Protection Agency (EPA), 2011, *EPISuite electronic database*.

2.0 Environmental Fate and Transport

Releases of 1,1,2,2-tetrachloroethane include process and fugitive emissions from its production and use as a chemical intermediate and industrial solvent, petroleum refining, incineration of chlorinated solvents, and evaporation from waste water streams (ATSDR, 2008). Most of the released 1,1,2,2-tetrachloroethane enters the atmosphere where it exists solely as a vapor and is very stable (half-life > 2 years) (HSDB, 2011). The chemical eventually diffuses to the stratosphere where it rapidly photodegrades. Wet deposition may remove some 1,1,2,2-tetrachloroethane from air, but volatilization from soil or surface water quickly returns it to the air.

1,1,2,2-Tetrachloroethane released to soil will be highly mobile and will infiltrate or leach to greater depths or to groundwater (ATSDR, 2008; HSDB, 2011). Some will also volatilize. Various hydrolytic, oxidative and biodegradation processes slowly transform the parent compound to 1,1,2-trichloroethane, trichloroethene, dichloroethene and vinyl chloride, all of

which are relatively stable and each of which is a toxicant in its own right. The biotransformation products are also subject to leaching to groundwater.

1,1,2,2-Tetrachloroethane released to water will be lost primarily by volatilization within days to weeks (ATSDR, 2008; HSDB, 2011). The compound is not expected to partition to sediment. Hydrolysis slowly converts the parent compound to trichloroethene.

Theoretical and empirical considerations suggest that participation in food-chain pathways is unlikely to be significant (HSDB, 2011; EPA, 1995); therefore, biotransfer factors are not provided.

3.0 Data for Evaluating Dermal Exposure

ATSDR (2008) summarized several studies that suggest that GI absorption of 1,1,2,2-tetrachloroethane is nearly complete in rats and mice. The most useful study reported excretion in rats and mice given a 150 mg/kg oral dose. Excretion was followed for 72 hours after treatment. Rats excreted 42 percent of the dose in expired air, 23 percent in urine and 4 percent in the feces. Mice excreted 51 percent in the breath, 22 percent in the urine and 6 percent in the feces. These data suggest that a minimum of approximately 95 percent of the oral dose was absorbed in both species, assuming that material recovered from the feces represents unabsorbed compound. EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Therefore, no GAF is developed for 1,1,2,2-tetrachloroethane and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

1,1,2,2-Tetrachloroethane is readily absorbed through the skin (HSDB, 2011), but data regarding the dermal uptake of 1,1,2,2-tetrachloroethane from soil were not located in the available literature. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of 1,1,2,2-tetrachloroethane from soil is not evaluated. K_p, τ, FA and B values are provided by EPA (2004) as follows:

Chemical	K_p	τ	FA	B
1,1,2,2-Tetrachloroethane	6.9E-3	0.93	1.0	0
K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).				

4.0 Noncancer Effects Evaluation

Single dose oral LD_{50} values in rats are grouped at 250 to 800 mg/kg (ATSDR, 2007). It appears that death is due largely to narcosis (probably accompanied by respiratory arrest and/or cardiovascular collapse). Prolonged oral exposure of laboratory animals to 1,1,2,2-tetrachloroethane is associated with liver and kidney effects (ATSDR, 2008).

Acute occupational exposure to high levels is associated with CNS effects; prolonged exposure to more moderate levels is associated with GI disturbances and liver damage (ATSDR, 2008).

The results of numerous subchronic studies were reviewed to derive a subchronic oral pRfD (EPA, 2008) for 1,1,2,2-tetrachloroethane. The lowest LOAEL identified was 40 mg/kg-day, in which increases in liver weights were observed (NTP, 2004). The results of several endpoints from this NTP study were evaluated using benchmark dose modeling, assuming 95% lower confidence limits, to identify potential points of departure to derive a subchronic pRfD. This modeling resulted in the identification of 10.8 mg/kg-day point of departure, based on increases in lever weights of male rats. This value can be regarded as an estimated NOAEL. An oral subchronic pRfD of 1E-2 mg/kg-day was derived by dividing this value by a composite UF of 1,000. This assumes a UF of 10 for each of the following: interspecies variability, intraspecies sensitivity, and deficiencies in the database (EPA, 2008).

Because of deficiencies in chronic animal studies, the subchronic NTP (2004) study used to derive the subchronic pRfD was also selected as the most appropriate to derive a chronic RfD. The chronic oral RfD of 4E-3 mg/kg-day was derived as described for the subchronic RfD, with an additional UF of 3 (for a composite UF of 3,000) to extrapolate from subchronic to chronic duration added to extrapolate from subchronic to chronic exposure for a composite UF of 3,000 (EPA, 2008).

Adequate studies for the derivation of inhalation pRfDs could not be located (EPA 2008)

5.0 Carcinogenicity Evaluation

Oral treatment with 1,1,2,2-tetrachloroethane is associated with a highly significant dose-related increase in hepatocellular carcinomas in rats (ATSDR, 2008). Occupational data regarding carcinogenicity in humans are inadequate. EPA (2011) classified 1,1,2,2-tetrachloroethane as a cancer weight-of-evidence Group C compound (possible human carcinogen), based on liver tumors in mice in a 78-week gavage study in which the test compound was dissolved in corn oil. EPA (2002) verified an oral SF of 2.0E-1 per mg/kg-day from the mouse study. The same data serve as the basis for an inhalation URF of 5.8E-5 per $\mu g/m^3$, which is equivalent to 2.0E-1 per mg/kg-day.

6.0 Toxicity Summary

Toxicity values for 1,1,2,2-tetrachloroethane are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	Sfi
1E-2	4E-3	L	ND	ND	NA	C	2.0E-1	C	5.8E-5	2.0E-1

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure[a]		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	Sfi
inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); ND = no data. Target organ abbreviations: L = liver; NA = not applicable. [a]sRfDo, cRfDo and SFo should be used for dermal exposure without adjustment for GI absorption.										

7.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 2008, ***Toxicological Profile for 1,1,2,2-Tetrachloroethane***, U.S. Department of Health and Human Services, Atlanta, Georgia, September.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

National Toxicology Program (NCP), 2004, ***NTP Technical Report on the Toxicity Studies of 1,1,2,2 Tetrachloroethane Administered in Microcapsules in Feed to F344/N Rats and B6C3F1Mice***, U.S. DHHS, Public Health Service, National Institute of Health. Toxicity Report Series, Number 49.

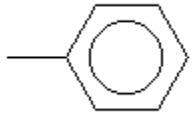
U.S. Environmental Protection Agency (EPA), 1995, Final Water Quality Guidance for the Great Lakes System; Final Rule, (40 CFR 9, 122, 123, 131, and 132), ***Federal Register***, 60(56): 15365-15425.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP, NTIS No. PB99-963312, July.

U.S. Environmental Protection Agency (EPA), 2008, ***Provisional Peer Reviewed Toxicity Values for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)***, National Center for Environmental Assessment, Cincinnati, Ohio, 24 August 14.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

TOLUENE (METHYLBENZENE) (108-88-3)



1.0 Introduction and Physical Properties

Toluene is a VOC that occurs as a colorless liquid at ambient temperatures (HSDB, 2011). It is back-blended into gasoline to improve octane rating, used to produce benzene, used as a solvent in paints, coatings, adhesives, inks and cleaning agents, and used in the synthesis of a wide range of organic chemicals, particularly benzene and its derivatives (ATSDR, 2000; HSDB, 2011). Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
92.1[a]	2.73[a]	6.64E-3[b] (25°C)	2.26[b]	8.70E-2[b] (25°C)	8.60E-6[b] (25°C)	3.74E-2[c] (25°C)	5.26E+2[b] (20-25°C)	383.78[d]	591.79[d]	7.93E+3[d]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);. $H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole); ND = no data.

[a]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final,*** Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP July.

[b]U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Fianl, Office of Solid Waste and Emergency Response, OSWER 9355.4-24, December.

[c]Hazardous Substance Data Bank (HSDB), 2004, National Library of Medicine, on line, accessed 23 April.

[d]U.S. Environmental Protection Agency (EPA), 2003, ***Users Guide for Evaluating Subsurface Vapor Intrusion into Buildings***, Office of Emergency and Remedial Response, Washington, D.C., 19 June.

2.0 Environmental Fate and Transport

Large amounts of toluene are released into the atmosphere each year, principally from the production, transport and use of gasoline (ATSDR, 2000; HSDB, 2011). Other major sources include volatilization of toluene-based solvents and thinners, and motor vehicle exhaust. Considerable amounts are discharged into waterways or spilled on land during the storage, transport and disposal of fuels and oils. Natural sources include emissions from volcanoes, forest fires and crude oil.

Toluene in the atmosphere will exist predominantly or entirely in the vapor phase, where it is subject to reaction with photochemically produced hydroxyl radicals (ATSDR, 2000; HSDB, 2011). It is also subject to reaction with various oxidizing agents in the atmosphere, but these reactions are far less significant. Wet deposition is another important process for removal of toluene from the atmosphere.

Toluene is expected to be moderately to highly mobile in soil and may leach to groundwater (ATSDR, 2000; HSDB, 2011). Volatilization is an important removal process for toluene near the surface of the soil. Biodegradation may also be significant in soil. Toluene in water will be

lost by both volatilization to the atmosphere and biodegradation. Which process predominates will depend on water temperature, mixing conditions and the existence of acclimated microorganisms at the site. The compound is not expected to sorb significantly to sediment or suspended organic matter in water.

Toluene theoretically may be expected to bioconcentrate because of its lipophilicity, but empirical data show that it is subject to rapid biotransformation, which greatly reduces this tendency (ATSDR, 2000). Overall, biotransfer is not expected to be significant (EPA, 1995) and biotransfer factors are not provided.

3.0 Toxicokinetics

Excretion data from humans and laboratory animals indicate that toluene is rapidly and extensively absorbed during inhalation and following oral administration (ATSDR, 2000). Data from humans suggest that pulmonary retention ranges from 50 to 83 percent of the inhaled concentration. GI absorption is practically complete in humans and animals. Administration of toluene in soil slows the rate but does not reduce the extent of GI absorption. Toluene is absorbed by the skin of humans and laboratory animals when applied as a liquid or as a water solution. Dermal uptake of toluene vapor has been demonstrated in animals. Data were not located regarding dermal uptake from soil.

Absorbed toluene is rapidly and widely distributed throughout the body (ATSDR, 2000). Highest levels are generally found in highly vascular and lipid-rich tissues, including the brain, particularly following inhalation, and the liver, particularly following ingestion. Levels in maternal tissues are generally much higher than those in fetal tissues. The nervous system is an important target for exposure to toluene, particularly following inhalation exposure.

The predominant metabolic pathway for toluene involves oxidation of the methyl group to form benzyl alcohol which is further oxidized to benzoic acid, followed by conjugation with glycine to form hippuric acid, which is recovered as the major urinary metabolite (ATSDR, 2000). A minor pathway involves hydroxylation of the benzene ring to form various cresol isomers, which undergo conjugation and excretion by the kidneys. Another minor pathway involves glutathione conjugation of benzyl alcohol to yield a mercapturic acid urinary metabolite. Quantitative differences in the relevance of these pathways have been shown for different species and different human racial groups.

The liver is the primary site of toluene biotransformation. The enzyme activity involved in toluene metabolism is low in the fetal liver, but reaches adult levels soon after birth. Low levels of detoxication activity in the fetus may increase the likelihood of developmental effects.

Toluene metabolites are rapidly excreted from the body, although excretion appears to be multi-phasic, reflecting release of toluene from adipose depots (ATSDR, 2000).

Nothing in this review of toxicokinetics suggests that laboratory animals would not serve as appropriate models for the toxicity of toluene to humans.

4.0 Dermal Exposure

EPA (2004) notes that organic chemicals are generally well absorbed from the GI tract, and recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. As noted above, GI absorption is practically complete. Therefore, no GAF is developed for toluene and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Data were not located for dermal uptake of toluene from soil. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of toluene from soil is not evaluated. EPA (2004) provides t*, K_p, τ, B and FA values as follows:

Chemical	t*	K_p	τ	FA	B
Toluene	0.84	3.1E-2	0.35	1.0	0.1
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ= lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

5.0 Noncancer Effects Evaluation

Acute inhalation (glue sniffing, solvent abuse, industrial accidents) or ingestion exposure to high levels of toluene induces CNS dysfunction and narcosis (ATSDR, 2000). Acute oral LD_{50} values include 2.6 to 7.5 g/kg in rats (HSDB, 2011), suggesting the acute toxicity is not high. Acute ingestion is associated with lesions in the heart, liver, lungs and kidneys (ATSDR, 2000). Prolonged oral exposure to lower levels is associated with pathological changes in the liver, kidney and brain. Changes in liver and kidney weights were observed in rats treated by gavage for 13 weeks at a dose rate of 446 mg/kg-day (NTP, 1990). Overt kidney effects were observed at higher doses (EPA, 2011). A NOAEL of 223 mg/kg-day was also observed in this NTP study.

EPA (2011) derived a verified chronic RfD for toluene, using the benchmark dose approach and the LOAEL of 446 mg/kg-day. The critical effect of absolute kidney weight was used. This approach derived a benchmark dose level of 238 mg/kg-day as the point of departure. The RfD of 8E-2 mg/kg-day is derived by dividing this value by a composite UF of 3000. This assumes a UF of 10 for each of the following: interspecies variability, intraspecies sensitivity, and subchronic to chronic extrapolation. An additional UF of 3 was added to account for deficiencies in the data base (EPA, 2011). The chronic RfD is also conservatively used for subchronic exposure.

Prolonged occupational (inhalation) exposure to toluene at concentrations near 100 ppm induces upper respiratory tract irritation and CNS dysfunction (EPA, 2011). The CNS effects are selected as the critical endpoint for a verified inhalation RfC of 5 mg/m^3. EPA (2011) considered a plethora of human studies in the derivation of this RfC. It is based on an average adjusted NOAEL from several studies of 46 mg/m^3 (EPA, 2011). An RfC of 5 mg/m^3 is derived from this value by dividing by a UF of 10 to account for inter-individual variability. This value equals an inhalation RfD of 1.4 mg/kg-day.

6.0 Carcinogenicity Evaluation

EPA (2011) verified toluene as a cancer weight-of-evidence Group D compound (not classifiable as to carcinogenicity to humans) based on a lack of human data and inadequate animal testing data. Potency factors are not available for Group D compounds.

7.0 Toxicity Summary

Toxicity values for toluene are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
8E-2	8E-2	K,	4E-1/ 1.1E-1	4E-1/ 1.1E-1	CNS	D	NA	D	NA	NA

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); NA = not applicable.
Target organ or critical effect abbreviations: K = kidney, CNS = central nervous system.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry, (ATSDR), 2000, ***Update Toxicological Profile for Toluene***, U.S. Public Health Service, Atlanta, Georgia, September.

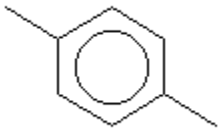
Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.
National Toxicology Program (NTP). 1990, Toxicology and Carcinogenesis Studies of Toluene (CAS No. 108-88-3) in F344/N Rats and B5C3F1 Mice (Inhalation Studies). Public Health Service, U.S. Department of Health and Human Services; NTP TR 371. Available from: National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency (EPA), 1995, "Final Water Quality Guidance for the Great Lakes System; Final Rule," (40 CFR 9, 122, 123, 131, and 132), ***Federal Register***, 60(56): 15365-15425.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Emergency and Remedial Response, EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

XYLENES (DIMETHYLBENZENE), TOTAL (1330-20-7)



p-Xylene

1.0 Introduction and Physical Properties

The xylenes, also known as dimethylbenzenes, exist as three isomers: 2-xylene (1,2-dimethylbenzene, ortho- or o-xylene) (95-47-6), 3-xylene (1,3-dimethylbenzene, meta- or m-xylene) (108-38-3) and 4-xylene (1,4-dimethylbenzene, para- or p-xylene) (106-42-3) (HSDB, 2011). The o-, m-, and p-xylene nomenclature will be used herein to be consistent with the manner in which xylene concentrations in environmental media are usually reported by the analytical laboratories.

The xylenes are **VOCs** derived from coal tar, coal gas, and petroleum distillation (ATSDR, 1995; HSDB, 2011). They occur as clear liquids in the pure state at most ambient temperatures, although 4-xylene occurs as colorless plates or prisms at temperatures below 56EF (13.33EC). Natural sources include petroleum, forest fires and volatiles from plants.

Xylenes are used in the manufacture of other organic compounds, dyes, insecticides and pharmaceuticals, and as solvents (ATSDR, 1995; HSDB, 2011). They are components of aviation gasoline, asphalt and naphtha, and automobile exhaust. Technical xylene consists of approximately 44 percent m-xylene, 20 percent o-xylene, 20 percent p-xylene, and 15 percent ethylbenzene. Relevant physical properties are compiled below:

MW	log K_{ow}	H	log K_{oc}	D_a	D_w	VP	S	T_b	T_c	$\Delta H_{v,b}$
o-Xylene (95-47-6)										
106.16[a]	3.12[a]	5.20E-3[b] (25°C)	2.56[b]	8.70E-2[b] (25°C)	1.00E-5[b] (25°C)	8.70E-3[a] (25°C)	1.78E+2[b] (20-25°C)	417.60[c]	630.30[c]	8.66E+3[c]
m-Xylene (108-38-3)										
106.2[d]	3.20[d]	7.34E-3[b] (25°C)	2.61[b]	7.00E-2[b] (25°C)	7.80E-6[b] (25°C)	1.09E-2[a] (25°C)	1.16E+2[b] (20-25°C)	412.27[c]	617.05[c]	8.52E+3[c]
p-Xylene (106-42-3)										
106.16[a]	3.15[a]	7.66E-3[b] (25°C)	2.59[b]	7.69E-2[b] (25°C)	8.44E-6[b] (25°C)	1.16E-2[a] (25°C)	1.85E+2[b] (20-25°C)	411.52[c]	616.20[c]	8.53E+3[c]

MW = molecular weight (g/mole); log K_{ow} = base 10 logarithm of the octanol/water partition coefficient (unitless); H = Henry's Law constant (atm-m^3/mole) at the reference temperature; log K_{oc} = base 10 logarithm of the soil/organic carbon partition coefficient (L/kg); D_a = diffusivity in air (cm^2/second); D_w = diffusivity in water (cm^2/second); VP = vapor pressure (atm) at the reference temperature; S = solubility in water (mg/L) at the reference temperature; T_b = normal boiling point (at 1 atm) of pure liquid compound (°K); T_c = critical temperature (°K);.$H_{v,b}$ = enthalpy of vaporization at the boiling point (cal/mole).

[a]Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

[b]U.S. U.S. Environmental Protection Agency (EPA), 2002, ***Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites***, Office of Solid Waste and Emergency Response, Washington, D.C., 9355.4-24, December.

[c]U.S. Environmental Protection Agency (EPA), 2000, ***User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings, Revised***, Office of Emergency and Remedial Response, Washington, D.C., December.

[d]U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

It is recommended that the physical properties for m-xylene should be applied to mixed xylene isomers or data where the specific isomer is not identified, because m-xylene is the major component of the technical mixture and is likely to predominate following xylene releases.

2.0 Environmental Fate and Transport

Naturally occurring sources of xylenes are petroleum, forest fires and volatiles from plants (ATSDR, 1995; HSDB, 2011). The production and use of xylenes in petroleum products and as chemical solvents and intermediates may result in their release to the environment as fugitives and through various waste streams. Off-gassing from landfills and automobile exhaust are other significant sources. Spills, leaking underground storage tanks and associated plumbing, and leaching from landfills may release xylenes to soil and groundwater.

Xylenes will exist solely in the vapor phase in the ambient atmosphere, where they are subject to degradation by reaction with photochemically-produced hydroxyl radicals as the only significant removal process (ATSDR, 1995; HSDB, 2011). The atmospheric lifetime of xylenes is about 1 to 2 days. Products of photooxidation include a wide variety of ring hydroxylation and ring cleavage products.

Volatilization is expected to be the major removal mechanism for xylenes released to surface soil, but, depending on the size and rate of release, the majority of the release may infiltrate to subsurface soil (ATSDR, 1995). Photooxidation may degrade a significant part of the small amount that remains at the surface. Biodegradation is probably the only significant subsurface removal mechanism, but it is expected to be slow. A wide range of experimental K_{oc} values have been reported in soil samples with differing pH and organic carbon content (HSDB, 2011), suggesting a wide range in the extent to which the xylenes adsorb to soil particles. Generally, however, xylene is fairly mobile and may readily leach to groundwater.

Volatilization is probably the most significant removal mechanism for xylenes in surface water (ATSDR, 1995). Biodegradation may occur in surface water, groundwater and landfill leachate, although quite slowly. Oxidative reactions are expected to be insignificant. Xylenes are expected to adsorb somewhat to suspended solids and sediment in water (HSDB, 2011).

Xylenes are not expected to participate significantly in food-chain pathways (ATSDR, 1995; HSDB, 2011); therefore, biotransfer factors are not provided.

3.0 Toxicokinetics

Xylenes are rapidly and extensively absorbed during inhalation and following oral exposure (ATSDR, 1995). In humans, approximately 50 to 73 percent of the inhaled concentration is retained. In laboratory animals, approximately 90 percent of an ingested dose is absorbed. Liquid xylene is absorbed through the skin of humans, but dermal uptake of xylene vapors approximates only 1 percent of inhalation uptake. A study in rats showed that dermal uptake of xylene adsorbed to soil is much slower than dermal uptake of the neat liquid.

Absorbed xylene is largely bound to serum protein in the blood and is distributed rapidly and widely throughout the body, but particularly to highly vascular tissues and those high in lipid content (e.g., blood, brain, liver) (ATSDR, 1995). Levels in fetal tissues approximate 2 percent of those measured in maternal brain.

The predominant metabolic pathway in humans and animals for all xylene isomers is oxidation of one of the methyl groups to the corresponding alcohol, with further oxidation to the

corresponding methylbenzoic acid (ATSDR, 1995). The methylbenzoic acids conjugate with glycine to form the corresponding methylhippuric acids, which are the major urinary metabolites. Much lesser quantities of the alcohols and o-methylbenzoic acid are also excreted in the urine. Methylbenzaldehyde, proposed as the ultimate toxicant because it inactivates enzymes involved in electron transport, has been identified in laboratory animals but not in humans. Metabolism in laboratory animals differs from that in humans largely in the nature of the conjugates that are formed. Ring hydroxylation to form phenolic compounds represents a minor metabolic pathway is both humans and animals.

The xylenes are rapidly excreted from the body, largely in the form of urinary metabolites (ATSDR, 1955) as described above. Approximately 5 percent of an oral dose is eliminated in the breath as unchanged compound. Residues are slightly more persistent in adiposa and muscle tissue than other tissues of the body, but no organ or tissue accumulates xylene residues.

4.0 Dermal Exposure

EPA (2004) recommends that oral toxicity values should not be adjusted when used for dermal exposure unless empirical data demonstrate that GI absorption is significantly less than complete. Xylenes are nearly completely absorbed from the GI tract; therefore, no GAF is developed for the xylenes and the oral toxicity values described below should be used for dermal exposure without adjustment for GI absorption.

Xylene in soil is absorbed by the skin, albeit very slowly, but quantitative data were not located. VOCs tend to volatilize from soil when applied to the skin, reducing dermal uptake to toxicologically insignificant levels (EPA, 2004). Therefore, dermal uptake of xylenes from soil is not evaluated. Values for t*, K_p, τ, FA and B are provided by EPA (2004) for m-xylene as follows:

Chemical	t*	K_p	τ	FA	B
m-Xylene	1.01	5.3E-2	0.42	1.0	0.2
t* = time for dermal uptake to reach steady state (hours); K_p = permeability coefficient (cm/hour); τ = lag time for chemical to cross stratum corneum (hours); FA = fraction absorbed (unitless); B = ratio of the permeability coefficient for passage across the stratum corneum relative to the permeability coefficient for passage across the viable epidermis (unitless).					

The dermal uptake parameters presented by EPA (2004) for m-xylene are applied to all the xylene isomers as well as to total xylenes.

5.0 Noncancer Effects Evaluation

Oral LD_{50} values for xylenes include 3.5 to 8.6 g/kg in rats and 1.6 to 5.6 g/kg in mice (HSDB, 2011), suggesting that the acute toxicity is low, but that mice may be slightly more sensitive than rats to the acute effects of ingested xylenes. Prolonged oral exposure of animals to xylenes is associated with reduced body weight and survival without histopathological alterations in the internal organs (EPA, 2011). EPA (2011) confirmed a previously verified chronic oral RfD for total xylenes of 2E-1 mg/kg-day based on a NOAEL of 250 mg/kg, equivalent to a continuous dose rate of 179 mg/kg-day, for decreased body weight and survival in male rats in chronic gavage studies with mixed xylenes. The LOAEL was 500 mg/kg, equivalent to 357 mg/kg-day. Mice were also included in the study. The LOAEL in mice was 1000 mg/kg, equivalent to 714 mg/kg-day, associated with hyperactivity, which was consistently observed at 5 to 30 minutes

after treatment. The mice did not exhibit the effects on body weight or survival that was observed with the rats, establishing the rat as the more sensitive species to prolonged oral exposure. An uncertainty factor of 1000 was applied to the rat NOAEL to derive the verified chronic oral RfD. Confidence in the chronic oral RfD is medium.

EPA (1997) presented provisional chronic oral RfDs for o-xylene and m-xylene of 2E+0 mg/kg-day based on an earlier IRIS evaluation of the same rat and mouse gavage study. Given the EPA (2011) re-evaluation of this study and the lowering of the chronic oral RfD by an order of magnitude, it seems prudent to adopt the verified chronic oral RfD of 2E-1 mg/kg-day for use with mixed xylenes and all xylene isomers. The critical effects of prolonged oral exposure to xylenes are reduced body weight and reduced survival. The verified chronic oral RfD is adopted as sufficiently protective for subchronic oral exposure to mixed xylenes and all xylene isomers.

Occupational exposure to xylenes induces CNS effects and GI disturbances (ACGIH, 1991). Other effects attributed to occupational exposure to xylene (blood dyscrasias, and heart, liver and kidney damage) may arise from concurrent exposure to other chemicals. EPA (2011) verified a chronic inhalation RfC of 1E-1 mg/m^3 based on CNS effects. In the key study, male rats were intermittently exposed to m-xylene at airborne concentrations of 0, 50 or 100 ppm for three months. Endpoints evaluated included spontaneous motor activity and motor coordination as measured by performance on a rotorod. Body and organ weights and limited blood chemistry and hematological parameters were also evaluated, but minor alterations in these endpoints were not attributed to exposure to m-xylene. The study identified 50 ppm as the NOAEL and 100 ppm as the LOAEL for impaired rotorod performance. The NOAEL is equivalent to an adjusted human equivalent concentration of 39 mg/m^3. Application of an uncertainty factor of 300 to the NOAEL yields the verified chronic inhalation RfC of 1E-1 mg/m^3, which is equivalent to a chronic inhalation RfD of 2.9E-2 mg/kg-day. The uncertainty factor consists of a factor of 10 to provide greater protection for more sensitive individuals, and factors of 3 each to extrapolate from animals to humans, to expand from subchronic to chronic exposure, and to account for deficiencies in the data base. The CNS is considered to be the target organ for prolonged inhalation exposure to xylenes. Confidence in the chronic inhalation RfC is medium.

No EPA-derived subchronic inhalation RfC is available for exposure to xylene. However, a preliminary subchronic inhalation RfC can be derived by applying an uncertainty factor of 100 to the NOAEL of 39 mg/m^3 in the subchronic rotorod study in rats described above. The uncertainty factor of 100 reflects the chronic uncertainty factor of 300 without the factor of 3 to expand from subchronic to chronic exposure. The preliminary subchronic inhalation RfC so derived is 4E-1 mg/m^3, which is equivalent to a subchronic inhalation RfD of 1.1E-1 mg/kg-day.

6.0 Carcinogenicity Evaluation

Xylene was previously characterized as a cancer weight-of-evidence Group D compound (not classifiable as to carcinogenicity to humans). Using a more descriptive characterization, EPA (2011) concluded that the cancer *data are inadequate for an assessment of the carcinogenic potential of xylenes*. Adequate human data on the carcinogenicity of the xylenes are not available, and the available animal data are inconclusive as to the ability of xylenes to cause a carcinogenic response. Evaluations of the genotoxic effects of xylenes have consistently given negative results. Potency factors are not available.

7.0 Toxicity Summary

Toxicity values for the xylenes are summarized below:

Noncancer Effects						Carcinogenicity				
Oral Exposure[a]			Inhalation Exposure			Oral Exposure		Inhalation Exposure		
sRfDo	cRfDo	TO	sRfC/ sRfDi	cRfC/ cRfDi	TO	WOE	SFo	WOE	URFi	SFi
2E-1	2E-1	BW, Su	4E-1/ 1.1E-1	1E-1/ 2.9E-2	CNS	D	NA	D	NA	NA

sRfDo = subchronic oral reference dose (milligrams per kilogram-day); cRfDo = chronic oral reference dose (milligrams per kilogram-day); TO = target organ(s) or critical effect(s); sRfC = subchronic inhalation reference concentration (milligrams per cubic meter); sRfDi = subchronic inhalation reference dose (milligrams per kilogram-day); cRfC = chronic inhalation reference concentration (milligrams per cubic meter); cRfDi = chronic inhalation reference dose (milligrams per kilogram-day); WOE = cancer weight-of-evidence evaluation; SFo = oral cancer slope factor (risk per milligram per kilogram-day); URFi = inhalation unit risk factor (risk per microgram per cubic meter); SFi = inhalation cancer slope factor (risk per milligram per kilogram-day); NA = not applicable.
Target organ or critical effect abbreviations: BW = reduced body weight; Su = reduced survival; CNS = central nervous system.
[a]sRfDo and cRfDo should be used for dermal exposure without adjustment for GI absorption.

8.0 References

Agency for Toxic Substances and Disease Registry (ATSDR), 1995, ***Update Toxicological Profile for Xylenes***, U.S. Department of Health and Human Services, Atlanta, Georgia, August, on line.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, ***Documentation of the Threshold Limit Values and Biological Exposure Indices***, Sixth Edition, Cincinnati, Ohio, pp. 1732-1740.

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, NTIS No. PB97-921199.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E - Supplemental Guidance for Dermal Risk Assessment)***, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R-99/005, July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

Miscellaneous

NITRATE (14797-55-8) and NITRITE (14797-65-0)

Nitrate is a naturally occurring member of the nitrogen cycle, being formed and released by nitrogen-fixing bacteria (EPA, 1989; Kettrup and Huppe, 1988). Nitrates are used largely as fertilizers. Relevant physical properties are compiled below:

MW (g/mole)	log K_{ow} (unitless)	H (atm-m^3/mole)	K_d (L/kg)	D_a (cm^2/s)	D_w (cm^2/s)	VP (atm)	S (mg/L)
Nitrate							
62.00 (anion)	NA	NA	NA	NA	NA	NA	Note 1[a]
Nitrite							
46.01 (anion)	NA	NA	NA	NA	NA	NA	Note 1[a]

NA = not applicable.
Note 1: Variable; many nitrate and nitrate salts are very soluble.
[a]Budavari, S, Ed., 1989, ***The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals***, Eleventh Edition, Merck & Co., Rahway, NJ.

Agricultural application of synthetic fertilizer and animal waste is a major mechanism by which nitrates are released to the environment (EPA, 1989; HSDB, 2011). It is also possible that the degradation of nitroaromatic compounds could contribute nitrate to the environment. Data were not located regarding the fate of nitrate or nitrite in the atmosphere, but the high solubility of many nitrate/nitrite compounds suggests that wet deposition may be a major removal process. Nitrate and nitrite in soil and water will exist largely as the soluble anions (EPA, 1989). Chemical interconversion and microbial transformation to other nitrogenous species will occur in soil and water. Biotransfer factors for nitrogen are compiled below:

BCF (L/kg)	Bpr (unitless)	Bpv (unitless)	Bb (unitless)	Bm (unitless)
ND	3.0E+1[a]	3.0E+1[a]	NA (see below)	NA (see below)

ND = no data; NA = not applicable.
[a]Baes, C.F., R.D. Sharp, A.L. Sjoreen, R.W. Shor, 1984, ***A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture***, Health and Safety Division, Oak Ridge National Laboratory, ORNL-5786, September.

It is well established that certain plants grown in soil containing high levels of nitrates (e.g., highly fertilized) may accumulate high levels of nitrate (Menzer, 1991). This is of particular concern to the welfare of domestic ruminant species, which consume large quantities of heavily fertilized forages. Animals, however, do not tend to bioaccumulate nitrate or nitrate. Therefore, human ingestion of food products from animals that consumed feedstuffs obtained from soils with high levels of nitrate is not likely to be a matter for concern.

Data regarding the GI absorption of nitrate/nitrite nitrogen are of limited usefulness. Several competing processes may occur in the acidic and reducing milieu of the GI tract, including conversion of nitrite to N_2O_2, which is probably readily absorbed (EPA, 1989). *In vivo* and *in vitro* studies indicate that GI absorption of nitrite (the first reduction product of nitrate) may approach 50 to 80 percent. A GAF is of 1 is used per the recommendation of EPA (2004) for chemicals that are absorbed from the GI tract at 50 percent or greater.

Data regarding the dermal absorption of nitrate/nitrite nitrogen were not located; therefore, no ABS value is selected, consistent with EPA (2004) guidance for the evaluation of inorganic constituents. Data were not located regarding the dermal uptake of nitrate/nitrite nitrogen from water. However, as noted above, most nitrate and nitrite salts are very soluble in water. Therefore, it is assumed that the nitrate and nitrite anion may be absorbed by the skin at the same rate as water. The PC for water of 1E-3 cm/hour (EPA, 1992) is adopted for nitrate/nitrite nitrogen.

The oral toxicity of nitrate is mediated by its reduction to nitrite by the microflora of the GI tract (EPA, 2002). Nitrite oxidizes hemoglobin to methemoglobin, which is incapable of transporting oxygen from the lungs to the tissues. Human toxicity is generally associated with high levels of nitrate or nitrite in drinking water. Infants are the most sensitive members of the population. EPA (2011) presents a verified chronic oral RfD for nitrate of 1.6E+0 mg nitrate nitrogen/kg-day, based on a NOAEL of 1.6 mg/kg-day for methemoglobinemia in infants and an uncertainty factor of 1. Confidence in the oral RfD is high. EPA (2011) also presents a verified chronic oral RfD for nitrite of 1E-1 mg nitrite nitrogen/kg-day, based on the same NOAEL and an uncertainty factor of 10. Confidence in the oral RfD is high. The target tissue for the toxicity of nitrate or nitrite is the erythrocyte. The chronic oral RfD of 1E-1 for nitrite nitrogen is adopted as the conservative estimate of a chronic oral RfD for nitrate/nitrite nitrogen.

Data regarding the toxicity of inhalation exposure to nitrate/nitrite nitrogen were not located; an inhalation RfC cannot be developed.

Data regarding the carcinogenicity of uncombined nitrate or nitrite were not located. Nitrite can combine with secondary amines in food or other nitrogenous compounds to form nitrosamines or other N-nitroso compounds, many of which are important animal carcinogens (Menzer, 1991).

References for Nitrate/Nitrite

Hazardous Substance Data Bank (HSDB), 2011, National Library of Medicine, on line.

Kettrup, A and U. Huppe, 1988, "Nitrogen," in Seiler, H.G. and H. Sigel, eds., ***Handbook on Toxicity of Inorganic Compounds***, Marcel Dekker, Inc., New York, pp. 475-489.

Menzer, R.E., 1991, "Water and Soil Pollutants." In: M.O. Amdur, J. Doull and C.D. Klaassen, eds., ***Casarett and Doull's Toxicology, the Basic Science of Poisons***, Fourth Edition, New York: Pergamon Press, p. 872-902.

U.S. Environmental Protection Agency (EPA), 1989, ***Health and Environmental Effects Document for Nitrite***, Final Draft, Prepared by the Environmental Criteria and Assessment Office, Cincinnati, Ohio, for the Office of Solid Waste, Washington, D.C., ECAO-CIN-GO59.

U.S. Environmental Protection Agency (EPA), 1992, ***Dermal Exposure Assessment: Principles and Applications***, Interim Report, Office of Research and Development, Washington, D.C., EPA/600/8-91/011B, January.

U.S. Environmental Protection Agency (EPA), 2004, ***Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final***, Office of Superfund Remediation and Technology Innovation, Washington, D.C., EPA/540/R/99/005, OSWER 9285.7-02EP July.

U.S. Environmental Protection Agency (EPA), 2011, ***Integrated Risk Information System (IRIS)***, National Center for Environmental Assessment, Cincinnati, Ohio, on line.

APPENDIX D

RISK CHARACTERIZATION SPREADSHEETS

Table D-1

Groundskeeper, Current Scenario, Exposure to Surface Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

(Page 1 of 2)

		Incidental Ingestion				Dermal Contact				
Chemicals of Potential Concern	EPC mg/kg	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	Dose Absorbed mg/cm^2-day	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ
Inorganics										
Vanadium	3.42E+01	1.20E-05	3.35E-05	NA	6.69E-03	NA	NA	NA	NA	NA
Polychlorinated biphenyls (PCB)										
Aroclor 1254	1.05E-01	3.67E-08	1.03E-07	7.34E-08	5.14E-03	2.94E-09	3.39E-08	9.49E-08	6.78E-08	4.75E-03
Explosives										
Trinitrotoluene, 2,4,6-	2.32E+01	8.11E-06	2.27E-05	2.43E-07	4.54E-02	1.49E-07	1.71E-06	4.80E-06	5.14E-08	9.60E-03
Semivolatile Organic Compounds										
Benzo(a)anthracene	2.12E-01	7.41E-08	2.07E-07	5.41E-08	NA	5.51E-09	6.36E-08	1.78E-07	4.64E-08	NA
Benzo(a)pyrene	2.03E-01	7.09E-08	1.99E-07	5.18E-07	NA	5.28E-09	6.09E-08	1.70E-07	4.44E-07	NA
Benzo(b)fluoranthene	2.68E-01	9.37E-08	2.62E-07	6.84E-08	NA	6.97E-09	8.04E-08	2.25E-07	5.87E-08	NA
Indeno(1,2,3-cd)pyrene	2.28E-01	7.97E-08	2.23E-07	5.82E-08	NA	5.93E-09	6.84E-08	1.91E-07	4.99E-08	NA
Total ILCR or HI				**1.02E-06**	**5.73E-02**				**7.19E-07**	**1.43E-02**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/m^3 - milligram per cubic meter

Table D-1

Groundskeeper, Current Scenario, Exposure to Surface Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

Chemicals of Potential Concern	Concentration in Air C_a mg/m^3	Inhalation Cancer Dose mg/kg-day	Inhalation Noncancer Dose mg/kg-day	Inhalation ILCR	Inhalation HQ	**All Pathways Total ILCR**	**All Pathways Total HI**
Inorganics							
Vanadium	3.42E-06	2.39E-07	6.69E-07	NA	NA	**NA**	**6.69E-03**
Polychlorinated biphenyls (PCB)							
Aroclor 1254	1.05E-08	7.34E-10	2.05E-09	1.47E-09	NA	**1.43E-07**	**9.88E-03**
Explosives							
Trinitrotoluene, 2,4,6-	2.32E-06	1.62E-07	4.54E-07	NA	NA	**2.95E-07**	**5.50E-02**
Semivolatile Organic Compounds							
Benzo(a)anthracene	2.12E-08	1.48E-09	4.15E-09	4.59E-10	NA	**1.01E-07**	**NA**
Benzo(a)pyrene	2.03E-08	1.42E-09	3.97E-09	4.40E-09	NA	**9.67E-07**	**NA**
Benzo(b)fluoranthene	2.68E-08	1.87E-09	5.24E-09	5.81E-10	NA	**1.28E-07**	**NA**
Indeno(1,2,3-cd)pyrene	2.28E-08	1.59E-09	4.46E-09	4.94E-10	NA	**1.09E-07**	**NA**
Total ILCR or HI				**7.40E-09**	**NA**	**1.74E-06**	**7.16E-02**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/m^3 - milligram per cubic meter

Table D-2

Groundskeeper, Future Scenario, Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

(Page 1 of 2)

		Incidental Ingestion				Dermal Contact				
Chemicals of Potential Concern	EPC mg/kg	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	Dose Absorbed mg/cm^2-day	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ
Inorganics										
Vanadium	2.62E+01	9.14E-06	2.56E-05	NA	5.12E-03	NA	NA	NA	NA	NA
Polychlorinated biphenyls (PCB)										
Aroclor 1254	9.17E-02	3.20E-08	8.97E-08	6.41E-08	4.49E-03	2.57E-09	2.96E-08	8.29E-08	5.92E-08	4.15E-03
Explosives										
Dinitrobenzene, 1,3-	5.22E-01	1.82E-07	5.11E-07	NA	5.11E-03	1.04E-08	1.20E-07	3.37E-07	NA	3.37E-03
Dinitrotoluene, 2,4-	1.25E+00	4.37E-07	1.22E-06	2.97E-07	6.12E-04	2.55E-08	2.94E-07	8.23E-07	2.00E-07	4.12E-04
Dinitrotoluene, 2,6-	5.47E-01	1.91E-07	5.35E-07	1.30E-07	5.35E-04	1.08E-08	1.25E-07	3.50E-07	8.49E-08	3.50E-04
Trinitrotoluene, 2,4,6-	2.20E+01	7.69E-06	2.15E-05	2.31E-07	4.31E-02	1.41E-07	1.62E-06	4.55E-06	4.87E-08	9.09E-03
Semivolatile Organic Compounds										
Benzo(a)anthracene	1.98E-01	6.92E-08	1.94E-07	5.05E-08	NA	5.15E-09	5.94E-08	1.66E-07	4.33E-08	NA
Benzo(a)pyrene	2.08E-01	7.27E-08	2.04E-07	5.31E-07	NA	5.41E-09	6.24E-08	1.75E-07	4.55E-07	NA
Benzo(b)fluoranthene	2.98E-01	1.04E-07	2.92E-07	7.60E-08	NA	7.75E-09	8.94E-08	2.50E-07	6.52E-08	NA
Indeno(1,2,3-cd)pyrene	3.39E-01	1.18E-07	3.32E-07	8.65E-08	NA	8.81E-09	1.02E-07	2.85E-07	7.42E-08	NA
Total ILCR or HI				**1.47E-06**	**5.89E-02**				**1.03E-06**	**1.74E-02**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/m^3 - milligram per cubic meter

Table D-2

Groundskeeper, Future Scenario, Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

Chemicals of Potential Concern	Concentration in Air C_a mg/m^3	Inhalation Cancer Dose mg/kg-day	Inhalation Noncancer Dose mg/kg-day	Inhalation ILCR	Inhalation HQ	**All Pathways Total ILCR**	**All Pathways Total HI**
Inorganics							
Vanadium	2.62E-06	1.83E-07	5.12E-07	NA	NA	**NA**	**5.12E-03**
Polychlorinated biphenyls (PCB)							
Aroclor 1254	9.17E-09	6.41E-10	1.79E-09	1.28E-09	NA	**1.25E-07**	**8.63E-03**
Explosives							
Dinitrobenzene, 1,3-	5.22E-08	3.65E-09	1.02E-08	NA	NA	**NA**	**8.48E-03**
Dinitrotoluene, 2,4-	1.25E-07	8.74E-09	2.45E-08	NA	NA	**4.97E-07**	**1.02E-03**
Dinitrotoluene, 2,6-	5.47E-08	3.82E-09	1.07E-08	NA	NA	**2.15E-07**	**8.85E-04**
Trinitrotoluene, 2,4,6-	2.20E-06	1.54E-07	4.31E-07	NA	NA	**2.79E-07**	**5.21E-02**
Semivolatile Organic Compounds							
Benzo(a)anthracene	1.98E-08	1.38E-09	3.87E-09	4.29E-10	NA	**9.43E-08**	**NA**
Benzo(a)pyrene	2.08E-08	1.45E-09	4.07E-09	4.51E-09	NA	**9.90E-07**	**NA**
Benzo(b)fluoranthene	2.98E-08	2.08E-09	5.83E-09	6.46E-10	NA	**1.42E-07**	**NA**
Indeno(1,2,3-cd)pyrene	3.39E-08	2.37E-09	6.63E-09	7.34E-10	NA	**1.61E-07**	**NA**
Total ILCR or HI				**7.60E-09**	**NA**	**2.50E-06**	**7.63E-02**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/m^3 - milligram per cubic meter

Table D-3

Groundskeeper, Future Scenario, Exposure to Bedrock Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion				Dermal Contact					All Pathways	
Chemicals of Potential Concern	EPC mg/L	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	Dose Absorbed mg/cm^2-day	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	**Total ILCR**	**Total HI**
Inorganics												
Arsenic	1.29E-01	4.51E-04	1.26E-03	6.76E-04	4.21E+00	1.29E-07	1.49E-06	4.17E-06	2.23E-06	1.39E-02	**6.78E-04**	**4.22E+00**
Chromium, Total	3.30E-03	1.15E-05	3.23E-05	NA	1.54E-03	3.30E-09	3.81E-08	1.07E-07	NA	3.95E-04	**NA**	**1.93E-03**
Iron	2.60E+00	9.09E-03	2.54E-02	NA	3.63E-02	2.60E-06	3.00E-05	8.40E-05	NA	NA	**NA**	**3.63E-02**
Manganese	8.60E-01	3.01E-03	8.41E-03	NA	1.79E-01	8.60E-07	9.92E-06	2.78E-05	NA	1.46E-02	**NA**	**1.94E-01**
Semivolatile Organic Compounds												
Methylnaphthalene, 2-	1.61E-02	5.63E-05	1.58E-04	NA	3.94E-02	3.22E-06	3.72E-05	1.04E-04	NA	2.60E-02	**NA**	**6.54E-02**
Naphthalene	1.95E-02	6.81E-05	1.91E-04	NA	9.54E-03	1.90E-06	2.19E-05	6.12E-05	NA	3.06E-03	**NA**	**1.26E-02**
Volatile Organic Compounds												
Benzene	4.03E-01	1.41E-03	3.94E-03	7.75E-05	9.86E-01	9.00E-06	1.04E-04	2.91E-04	5.71E-06	7.26E-02	**8.32E-05**	**1.06E+00**
Chloroform	1.97E-02	6.88E-05	1.93E-04	NA	1.93E-02	2.62E-07	3.02E-06	8.45E-06	NA	8.45E-04	**NA**	**2.01E-02**
Chloromethane (Methyl Chloride)	3.13E-02	1.09E-04	3.06E-04	NA	NA	1.28E-07	1.47E-06	4.12E-06	NA	NA	**NA**	**NA**
Ethylbenzene	1.72E-01	6.01E-04	1.68E-03	NA	1.68E-02	1.51E-05	1.74E-04	4.87E-04	NA	4.87E-03	**NA**	**2.17E-02**
Methylene chloride	1.29E-02	4.51E-05	1.26E-04	3.38E-07	2.10E-03	7.06E-08	8.14E-07	2.28E-06	6.11E-09	3.80E-05	**3.44E-07**	**2.14E-03**
Tetrachloroethane, 1,1,2,2-	2.50E-03	8.74E-06	2.45E-05	1.75E-06	4.89E-04	4.60E-08	5.30E-07	1.48E-06	1.06E-07	2.97E-05	**1.85E-06**	**5.19E-04**
Toluene	5.30E-01	1.85E-03	5.19E-03	NA	6.48E-02	2.69E-05	3.10E-04	8.67E-04	NA	1.08E-02	**NA**	**7.57E-02**
Xylenes	1.04E+00	3.63E-03	1.02E-02	NA	5.09E-02	9.87E-05	1.14E-03	3.19E-03	NA	1.59E-02	**NA**	**6.68E-02**
General Chemistry												
Nitrate-Nitrite	2.20E+00	7.69E-03	2.15E-02	NA	2.15E-01	2.20E-06	2.54E-05	7.10E-05	NA	7.10E-04	**NA**	**2.16E-01**
Total ILCR or HI				**7.56E-04**	**5.83E+00**				**8.05E-06**	**1.64E-01**	**7.64E-04**	**5.99E+00**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram

Table D-4

Groundskeeper, Future Scenario, Exposure to Overburden Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion				Dermal Contact					All Pathways	
		Cancer	Noncancer			Dose	Cancer	Noncancer				
	EPC	Dose	Dose			Absorbed	Dose	Dose			Total	Total
Chemicals of Potential Concern	mg/L	mg/kg-day	mg/kg-day	ILCR	HQ	mg/cm²-day	mg/kg-day	mg/kg-day	ILCR	HQ	ILCR	HI
Inorganics												
Arsenic	6.90E-03	2.41E-05	6.75E-05	3.62E-05	2.25E-01	6.90E-09	7.96E-08	2.23E-07	1.19E-07	7.43E-04	**3.63E-05**	**2.26E-01**
Cobalt	1.10E-03	3.84E-06	1.08E-05	NA	3.59E-02	4.40E-10	5.07E-09	1.42E-08	NA	4.74E-05	**NA**	**3.59E-02**
Manganese	3.89E-01	1.36E-03	3.80E-03	NA	8.09E-02	3.89E-07	4.48E-06	1.25E-05	NA	6.60E-03	**NA**	**8.75E-02**
Nitroaromatics												
Dinitrotoluene, 2,4-	1.03E-03	3.61E-06	1.01E-05	2.46E-06	5.06E-03	9.38E-09	1.08E-07	3.03E-07	7.35E-08	1.51E-04	**2.53E-06**	**5.21E-03**
Dinitrotoluene, 2,6-	1.04E-03	3.62E-06	1.01E-05	2.46E-06	1.01E-02	6.36E-09	7.34E-08	2.05E-07	4.99E-08	2.05E-04	**2.51E-06**	**1.03E-02**
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	4.48E-03	1.56E-05	4.38E-05	2.19E-07	2.19E-03	1.01E-06	1.16E-05	3.26E-05	1.63E-07	1.63E-03	**3.82E-07**	**3.82E-03**
Total ILCR or HI				**4.13E-05**	**3.59E-01**				**4.06E-07**	**9.38E-03**	**4.17E-05**	**3.69E-01**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm² - milligram per square meter
mg/kg - milligram per kilogram

Table D-5

Indoor Worker, Future Scenario, Exposure to Surface Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion					
Chemicals of Potential Concern	EPC mg/kg	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	**Total ILCR**	**Total HI**
Inorganics							
Vanadium	3.42E+01	5.98E-06	1.67E-05	NA	3.35E-03	**NA**	**3.35E-03**
Polychlorinated biphenyls (PCB)							
Aroclor 1254	1.05E-01	1.83E-08	5.14E-08	3.67E-08	2.57E-03	**3.67E-08**	**2.57E-03**
Explosives							
Trinitrotoluene, 2,4,6-	2.32E+01	4.06E-06	1.14E-05	1.22E-07	2.27E-02	**1.22E-07**	**2.27E-02**
Semivolatile Organic Compounds							
Benzo(a)anthracene	2.12E-01	3.70E-08	1.04E-07	2.70E-08	NA	**2.70E-08**	**NA**
Benzo(a)pyrene	2.03E-01	3.55E-08	9.93E-08	2.59E-07	NA	**2.59E-07**	**NA**
Benzo(b)fluoranthene	2.68E-01	4.68E-08	1.31E-07	3.42E-08	NA	**3.42E-08**	**NA**
Indeno(1,2,3-cd)pyrene	2.28E-01	3.98E-08	1.12E-07	2.91E-08	NA	**2.91E-08**	**NA**
Total ILCR or HI						**5.08E-07**	**2.86E-02**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram

Table D-6

Indoor Worker, Future Scenario, Exposure to Bedrock Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion				Dermal Contact					All Pathways	
Chemicals of Potential Concern	EPC mg/L	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	Dose Absorbed mg/cm^2-day	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	**Total ILCR**	**Total HI**
Inorganics												
Arsenic	1.29E-01	4.51E-04	1.26E-03	6.76E-04	4.21E+00	1.29E-07	1.49E-06	4.17E-06	2.23E-06	1.39E-02	**6.78E-04**	**4.22E+00**
Chromium, Total	3.30E-03	1.15E-05	3.23E-05	NA	1.54E-03	3.30E-09	3.81E-08	1.07E-07	NA	3.95E-04	**NA**	**1.93E-03**
Iron	2.60E+00	9.09E-03	2.54E-02	NA	3.63E-02	2.60E-06	3.00E-05	8.40E-05	NA	NA	**NA**	**3.63E-02**
Manganese	8.60E-01	3.01E-03	8.41E-03	NA	1.79E-01	8.60E-07	9.92E-06	2.78E-05	NA	1.46E-02	**NA**	**1.94E-01**
Semivolatile Organic Compounds												
Methylnaphthalene, 2-	1.61E-02	5.63E-05	1.58E-04	NA	3.94E-02	3.22E-06	3.72E-05	1.04E-04	NA	2.60E-02	**NA**	**6.54E-02**
Naphthalene	1.95E-02	6.81E-05	1.91E-04	NA	9.54E-03	1.90E-06	2.19E-05	6.12E-05	NA	3.06E-03	**NA**	**1.26E-02**
Volatile Organic Compounds												
Benzene	4.03E-01	1.41E-03	3.94E-03	7.75E-05	9.86E-01	9.00E-06	1.04E-04	2.91E-04	5.71E-06	7.26E-02	**8.32E-05**	**1.06E+00**
Chloroform	1.97E-02	6.88E-05	1.93E-04	NA	1.93E-02	2.62E-07	3.02E-06	8.45E-06	NA	8.45E-04	**NA**	**2.01E-02**
Chloromethane (Methyl Chloride)	3.13E-02	1.09E-04	3.06E-04	NA	NA	1.28E-07	1.47E-06	4.12E-06	NA	NA	**NA**	**NA**
Ethylbenzene	1.72E-01	6.01E-04	1.68E-03	NA	1.68E-02	1.51E-05	1.74E-04	4.87E-04	NA	4.87E-03	**NA**	**2.17E-02**
Methylene chloride	1.29E-02	4.51E-05	1.26E-04	3.38E-07	2.10E-03	7.06E-08	8.14E-07	2.28E-06	6.11E-09	3.80E-05	**3.44E-07**	**2.14E-03**
Tetrachloroethane, 1,1,2,2-	2.50E-03	8.74E-06	2.45E-05	1.75E-06	4.89E-04	4.60E-08	5.30E-07	1.48E-06	1.06E-07	2.97E-05	**1.85E-06**	**5.19E-04**
Toluene	5.30E-01	1.85E-03	5.19E-03	NA	6.48E-02	2.69E-05	3.10E-04	8.67E-04	NA	1.08E-02	**NA**	**7.57E-02**
Xylenes	1.04E+00	3.63E-03	1.02E-02	NA	5.09E-02	9.87E-05	1.14E-03	3.19E-03	NA	1.59E-02	**NA**	**6.68E-02**
General Chemistry												
Nitrate-Nitrite	2.20E+00	7.69E-03	2.15E-02	NA	2.15E-01	2.20E-06	2.54E-05	7.10E-05	NA	7.10E-04	**NA**	**2.16E-01**
Total ILCR or HI				**7.56E-04**	**5.83E+00**				**8.05E-06**	**1.64E-01**	**7.64E-04**	**5.99E+00**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram

Table D-7

Indoor Worker, Future Scenario, Exposure to Overburden Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion				Dermal Contact					All Pathways	
		Cancer	Noncancer			Dose	Cancer	Noncancer				
Chemicals of Potential Concern	EPC mg/L	Dose mg/kg-day	Dose mg/kg-day	ILCR	HQ	Absorbed mg/cm^2-day	Dose mg/kg-day	Dose mg/kg-day	ILCR	HQ	**Total ILCR**	**Total HI**
Inorganics												
Arsenic	6.90E-03	2.41E-05	6.75E-05	3.62E-05	2.25E-01	6.90E-09	7.96E-08	2.23E-07	1.19E-07	7.43E-04	**3.63E-05**	**2.26E-01**
Cobalt	1.10E-03	3.84E-06	1.08E-05	NA	3.59E-02	4.40E-10	5.07E-09	1.42E-08	NA	4.74E-05	**NA**	**3.59E-02**
Manganese	3.89E-01	1.36E-03	3.80E-03	NA	8.09E-02	3.89E-07	4.48E-06	1.25E-05	NA	6.60E-03	**NA**	**8.75E-02**
Nitroaromatics												
Dinitrotoluene, 2,4-	1.03E-03	3.61E-06	1.01E-05	2.46E-06	5.06E-03	9.38E-09	1.08E-07	3.03E-07	7.35E-08	1.51E-04	**2.53E-06**	**5.21E-03**
Dinitrotoluene, 2,6-	1.04E-03	3.62E-06	1.01E-05	2.46E-06	1.01E-02	6.36E-09	7.34E-08	2.05E-07	4.99E-08	2.05E-04	**2.51E-06**	**1.03E-02**
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	4.48E-03	1.56E-05	4.38E-05	2.19E-07	2.19E-03	1.01E-06	1.16E-05	3.26E-05	1.63E-07	1.63E-03	**3.82E-07**	**3.82E-03**
Total ILCR or HI				**4.13E-05**	**3.59E-01**				**4.06E-07**	**9.38E-03**	**4.17E-05**	**3.69E-01**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram

Table D-8

Construction Worker, Current and Future Scenarios, Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

(Page 1 of 2)

		Incidental Ingestion				Dermal Contact				
Chemicals of Potential Concern	EPC mg/kg	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ	Dose Absorbed mg/cm^2-day	Cancer Dose mg/kg-day	Noncancer Dose mg/kg-day	ILCR	HQ
Inorganics										
Vanadium	2.62E+01	6.03E-07	8.42E-05	NA	1.68E-02	NA	NA	NA	NA	NA
Polychlorinated biphenyls (PCB)										
Aroclor 1254	9.17E-02	2.11E-09	2.95E-07	4.23E-09	1.48E-02	3.85E-09	8.88E-10	1.24E-07	1.78E-09	6.20E-03
Explosives										
Dinitrobenzene, 1,3-	5.22E-01	1.20E-08	1.68E-06	NA	1.68E-02	1.57E-08	3.61E-09	5.04E-07	NA	5.04E-03
Dinitrotoluene, 2,4-	1.25E+00	2.88E-08	4.03E-06	1.96E-08	2.01E-03	3.83E-08	8.82E-09	1.23E-06	6.00E-09	6.16E-04
Dinitrotoluene, 2,6-	5.47E-01	1.26E-08	1.76E-06	8.58E-09	1.76E-03	1.62E-08	3.75E-09	5.23E-07	2.55E-09	5.23E-04
Trinitrotoluene, 2,4,6-	2.20E+01	5.07E-07	7.08E-05	1.52E-08	1.42E-01	2.11E-07	4.87E-08	6.80E-06	1.46E-09	1.36E-02
Semivolatile Organic Compounds										
Benzo(a)anthracene	1.98E-01	4.57E-09	6.38E-07	3.33E-09	NA	7.72E-09	1.78E-09	2.49E-07	1.30E-09	NA
Benzo(a)pyrene	2.08E-01	4.80E-09	6.70E-07	3.50E-08	NA	8.11E-09	1.87E-09	2.61E-07	1.37E-08	NA
Benzo(b)fluoranthene	2.98E-01	6.87E-09	9.60E-07	5.02E-09	NA	1.16E-08	2.68E-09	3.74E-07	1.96E-09	NA
Indeno(1,2,3-cd)pyrene	3.39E-01	7.82E-09	1.09E-06	5.71E-09	NA	1.32E-08	3.05E-09	4.26E-07	2.23E-09	NA
Total ILCR or HI				**9.67E-08**	**1.94E-01**				**3.09E-08**	**2.60E-02**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/m^3 - milligram per cubic meter

Table D-8

Construction Worker, Current and Future Scenarios, Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

Chemicals of Potential Concern	Concentration in Air C_a mg/m^3	Inhalation Cancer Dose mg/kg-day	Inhalation Noncancer Dose mg/kg-day	Inhalation ILCR	Inhalation HQ	**All Pathways Total ILCR**	**All Pathways Total HI**
Inorganics							
Vanadium	9.16E-06	1.28E-08	1.79E-06	NA	NA	**NA**	**1.68E-02**
Polychlorinated biphenyls (PCB)							
Aroclor 1254	3.21E-08	4.49E-11	6.26E-09	8.97E-11	NA	**6.10E-09**	**2.10E-02**
Explosives							
Dinitrobenzene, 1,3-	1.83E-07	2.55E-10	3.57E-08	NA	NA	**NA**	**2.19E-02**
Dinitrotoluene, 2,4-	4.38E-07	6.12E-10	8.54E-08	NA	NA	**2.56E-08**	**2.63E-03**
Dinitrotoluene, 2,6-	1.91E-07	2.68E-10	3.74E-08	NA	NA	**1.11E-08**	**2.28E-03**
Trinitrotoluene, 2,4,6-	7.70E-06	1.08E-08	1.50E-06	NA	NA	**1.67E-08**	**1.55E-01**
Semivolatile Organic Compounds							
Benzo(a)anthracene	6.93E-08	9.69E-11	1.35E-08	3.00E-11	NA	**4.66E-09**	**NA**
Benzo(a)pyrene	7.28E-08	1.02E-10	1.42E-08	3.15E-10	NA	**4.90E-08**	**NA**
Benzo(b)fluoranthene	1.04E-07	1.46E-10	2.04E-08	4.52E-11	NA	**7.02E-09**	**NA**
Indeno(1,2,3-cd)pyrene	1.19E-07	1.66E-10	2.32E-08	5.14E-11	NA	**7.99E-09**	**NA**
Total ILCR or HI				**5.32E-10**	**NA**	**1.28E-07**	**2.20E-01**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/m^3 - milligram per cubic meter

Table D-9

Construction Worker, Current and Future Scenarios, Exposure to Sediment
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion				Dermal Contact					**All Pathways**	
		Cancer	Noncancer			Dose	Cancer	Noncancer				
Chemicals of Potential Concern	EPC mg/kg	Dose mg/kg-day	Dose mg/kg-day	ILCR	HQ	Absorbed mg/cm^2-day	Dose mg/kg-day	Dose mg/kg-day	ILCR	HQ	**Total ILCR**	**Total HI**
Inorganics												
Chromium, total	1.40E+01	3.23E-07	4.51E-05	NA	2.15E-03	NA	NA	NA	NA	NA	**NA**	**2.15E-03**
Total ILCR or HI				**NA**	**2.15E-03**				**NA**	**NA**	**NA**	**2.15E-03**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/cm^2 - milligram per centimeter squared

Table D-10

On-Site Resident, Future Scenario, Cancer Risk from Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion			Dermal Contact				
Chemicals of Potential Concern	EPC mg/kg	Adult Dose mg/kg-day	Child Dose mg/kg-day	Resident ILCR	Adult Dose Absorbed mg/cm^2-day	Adult Dose mg/kg-day	Child Dose Absorbed mg/cm^2-day	Child Dose mg/kg-day	Resident ILCR
Inorganics									
Vanadium	2.62E+01	1.11E-05	2.58E-05	NA	NA	NA	NA	NA	NA
Polychlorinated biphenyls (PCB)									
Aroclor 1254	9.17E-02	3.88E-08	9.04E-08	2.58E-07	8.99E-10	2.41E-08	2.57E-09	3.94E-08	1.27E-07
Explosives									
Dinitrobenzene, 1,3-	5.22E-01	2.21E-07	5.15E-07	NA	3.65E-09	9.78E-08	1.04E-08	1.60E-07	NA
Dinitrotoluene, 2,4-	1.25E+00	5.28E-07	1.23E-06	1.20E-06	8.93E-09	2.39E-07	2.55E-08	3.91E-07	4.29E-07
Dinitrotoluene, 2,6-	5.47E-01	2.31E-07	5.40E-07	5.24E-07	3.79E-09	1.01E-07	1.08E-08	1.66E-07	1.82E-07
Trinitrotoluene, 2,4,6-	2.20E+01	9.30E-06	2.17E-05	9.30E-07	4.93E-08	1.32E-06	1.41E-07	2.16E-06	1.04E-07
Semivolatile Organic Compounds									
Benzo(a)anthracene	1.98E-01	8.37E-08	1.95E-07	2.04E-07	1.80E-09	4.82E-08	5.15E-09	7.90E-08	9.29E-08
Benzo(a)pyrene	2.08E-01	8.79E-08	2.05E-07	2.14E-06	1.89E-09	5.07E-08	5.41E-09	8.30E-08	9.76E-07
Benzo(b)fluoranthene	2.98E-01	1.26E-07	2.94E-07	3.07E-07	2.71E-09	7.26E-08	7.75E-09	1.19E-07	1.40E-07
Indeno(1,2,3-cd)pyrene	3.39E-01	1.43E-07	3.34E-07	3.49E-07	3.08E-09	8.26E-08	8.81E-09	1.35E-07	1.59E-07
Total ILCR				**5.91E-06**					**2.21E-06**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
mg/kg - milligram per kilogram
mg/cm^2 - milligram per square meter
mg/m^3 - milligram per cubic meter

Table D-10

On-Site Resident, Future Scenario, Cancer Risk from Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

Chemicals of Potential Concern	Concentration in Air C_a mg/m^3	Inhalation Adult Dose mg/kg-day	Inhalation Child Dose mg/kg-day	Inhalation Resident ILCR	**All Pathways Total ILCR**
Inorganics					
Vanadium	5.15E-08	4.84E-09	2.82E-09	NA	**NA**
Polychlorinated biphenyls (PCB)					
Aroclor 1254	1.81E-10	1.70E-11	9.90E-12	5.37E-11	**3.85E-07**
Explosives					
Dinitrobenzene, 1,3-	1.03E-09	9.66E-11	5.63E-11	NA	**NA**
Dinitrotoluene, 2,4-	2.46E-09	2.31E-10	1.35E-10	NA	**1.63E-06**
Dinitrotoluene, 2,6-	1.08E-09	1.01E-10	5.90E-11	NA	**7.06E-07**
Trinitrotoluene, 2,4,6-	4.33E-08	4.07E-09	2.37E-09	NA	**1.03E-06**
Semivolatile Organic Compounds					
Benzo(a)anthracene	3.90E-10	3.66E-11	2.14E-11	1.80E-11	**2.97E-07**
Benzo(a)pyrene	4.10E-10	3.85E-11	2.24E-11	1.89E-10	**3.12E-06**
Benzo(b)fluoranthene	5.87E-10	5.51E-11	3.22E-11	2.71E-11	**4.46E-07**
Indeno(1,2,3-cd)pyrene	6.68E-10	6.27E-11	3.66E-11	3.08E-11	**5.08E-07**
Total ILCR				**3.18E-10**	**8.12E-06**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
mg/kg - milligram per kilogram
mg/cm^2 - milligram per square meter
mg/m^3 - milligram per cubic meter

Table D-11

On-Site Child Resident, Future Scenario, Noncancer Risk from Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			Concentration	Inhalation		**All**
	EPC	Child Dose	Child Resident	Dose Absorbed	Child Dose	Child Resident	in Air C_a	Child Dose	Child Resident	**Pathways Total**
Chemicals of Potential Concern	mg/kg	mg/kg-day	HQ	mg/cm^2-day	mg/kg-day	HQ	mg/m^3	mg/kg-day	HQ	**HI**
Inorganics										
Vanadium	2.62E+01	3.01E-04	6.02E-02	NA	NA	NA	5.15E-08	3.29E-08	NA	**6.02E-02**
Polychlorinated biphenyls (PCB)										
Aroclor 1254	9.17E-02	1.06E-06	5.28E-02	2.57E-09	4.60E-07	2.30E-02	1.81E-10	1.15E-10	NA	**7.57E-02**
Explosives										
Dinitrobenzene, 1,3-	5.22E-01	6.01E-06	6.01E-02	1.04E-08	1.87E-06	1.87E-02	1.03E-09	6.57E-10	NA	**7.88E-02**
Dinitrotoluene, 2,4-	1.25E+00	1.44E-05	7.19E-03	2.55E-08	4.56E-06	2.28E-03	2.46E-09	1.57E-09	NA	**9.47E-03**
Dinitrotoluene, 2,6-	5.47E-01	6.29E-06	6.29E-03	1.08E-08	1.94E-06	1.94E-03	1.08E-09	6.89E-10	NA	**8.23E-03**
Trinitrotoluene, 2,4,6-	2.20E+01	2.53E-04	5.06E-01	1.41E-07	2.52E-05	5.04E-02	4.33E-08	2.77E-08	NA	**5.57E-01**
Semivolatile Organic Compounds										
Benzo(a)anthracene	1.98E-01	2.28E-06	NA	5.15E-09	9.21E-07	NA	3.90E-10	2.49E-10	NA	**NA**
Benzo(a)pyrene	2.08E-01	2.39E-06	NA	5.41E-09	9.68E-07	NA	4.10E-10	2.62E-10	NA	**NA**
Benzo(b)fluoranthene	2.98E-01	3.43E-06	NA	7.75E-09	1.39E-06	NA	5.87E-10	3.75E-10	NA	**NA**
Indeno(1,2,3-cd)pyrene	3.39E-01	3.90E-06	NA	8.81E-09	1.58E-06	NA	6.68E-10	4.27E-10	NA	**NA**
Total HI			**6.93E-01**			**9.63E-02**			**NA**	**7.89E-01**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/cm^2 - milligram per square meter
mg/m^3 - milligram per cubic meter

Table D-12

On-Site Adult Resident, Future Scenario, Noncancer Risk from Exposure to Total Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			Concentration	Inhalation		**All**
	EPC	Adult Dose	Adult Resident	Dose Absorbed	Adult Dose	Adult Resident	in Air C_a	Adult Dose	Adult Resident	**Pathways Total**
Chemicals of Potential Concern	mg/kg	mg/kg-day	HQ	mg/cm^2-day	mg/kg-day	HQ	mg/m^3	mg/kg-day	HQ	**HI**
Inorganics										
Vanadium	2.62E+01	3.23E-05	6.45E-03	NA	NA	NA	5.15E-08	1.41E-08	NA	**6.45E-03**
Polychlorinated biphenyls (PCB)										
Aroclor 1254	9.17E-02	1.13E-07	5.65E-03	8.99E-10	7.02E-08	3.51E-03	1.81E-10	4.95E-11	NA	**9.16E-03**
Explosives										
Dinitrobenzene, 1,3-	5.22E-01	6.44E-07	6.44E-03	3.65E-09	2.85E-07	2.85E-03	1.03E-09	2.82E-10	NA	**9.29E-03**
Dinitrotoluene, 2,4-	1.25E+00	1.54E-06	7.71E-04	8.93E-09	6.97E-07	3.48E-04	2.46E-09	6.75E-10	NA	**1.12E-03**
Dinitrotoluene, 2,6-	5.47E-01	6.74E-07	6.74E-04	3.79E-09	2.96E-07	2.96E-04	1.08E-09	2.95E-10	NA	**9.70E-04**
Trinitrotoluene, 2,4,6-	2.20E+01	2.71E-05	5.42E-02	4.93E-08	3.85E-06	7.70E-03	4.33E-08	1.19E-08	NA	**6.19E-02**
Semivolatile Organic Compounds										
Benzo(a)anthracene	1.98E-01	2.44E-07	NA	1.80E-09	1.41E-07	NA	3.90E-10	1.07E-10	NA	**NA**
Benzo(a)pyrene	2.08E-01	2.56E-07	NA	1.89E-09	1.48E-07	NA	4.10E-10	1.12E-10	NA	**NA**
Benzo(b)fluoranthene	2.98E-01	3.67E-07	NA	2.71E-09	2.12E-07	NA	5.87E-10	1.61E-10	NA	**NA**
Indeno(1,2,3-cd)pyrene	3.39E-01	4.18E-07	NA	3.08E-09	2.41E-07	NA	6.68E-10	1.83E-10	NA	**NA**
Total HI			**7.42E-02**			**1.47E-02**			**NA**	**8.89E-02**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/cm^2 - milligram per square meter
mg/m^3 - milligram per cubic meter

Table D-13

On-Site Resident, Future Scenario, Cancer Risk from Exposure to Bedrock Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion			Dermal Contact					Inhalation of VOCs				All
		Adult	Child		Dose	Adult	Dose	Child		Concentration	Adult	Child		Pathways
Chemicals of Potential Concern	EPC mg/L	Dose mg/kg-day	Dose mg/kg-day	ILCR	Absorbed mg/cm^2-day	Dose mg/kg-day	Absorbed mg/cm^2-day	Dose mg/kg-day	ILCR	in Air mg/m^3	Dose mg/kg-day	Dose mg/kg-day	ILCR	Total ILCR
Inorganics														
Arsenic	1.29E-01	1.21E-03	7.07E-04	2.88E-03	2.58E-08	2.42E-06	4.30E-08	1.55E-06	5.97E-06	NA	NA	NA	NA	**2.88E-03**
Chromium, Total	3.30E-03	3.10E-05	1.81E-05	NA	6.60E-10	6.20E-08	1.10E-09	3.97E-08	NA	NA	NA	NA	NA	**NA**
Iron	2.60E+00	2.44E-02	1.42E-02	NA	5.20E-07	4.88E-05	8.66E-07	3.13E-05	NA	NA	NA	NA	NA	**NA**
Manganese	8.60E-01	8.08E-03	4.71E-03	NA	1.72E-07	1.62E-05	2.86E-07	1.04E-05	NA	NA	NA	NA	NA	**NA**
Semivolatile Organic Compounds														
Methylnaphthalene, 2-	1.61E-02	1.51E-04	8.82E-05	NA	7.21E-07	6.77E-05	9.30E-07	3.36E-05	NA	8.05E-03	7.56E-04	4.40E-04	NA	**NA**
Naphthalene	1.95E-02	1.83E-04	1.07E-04	NA	4.24E-07	3.98E-05	5.47E-07	1.98E-05	NA	9.75E-03	9.15E-04	5.33E-04	1.74E-04	**1.74E-04**
Volatile Organic Compounds														
Benzene	4.03E-01	3.79E-03	2.21E-03	3.30E-04	2.01E-06	1.89E-04	2.60E-06	9.39E-05	1.56E-05	2.02E-01	1.89E-02	1.10E-02	8.08E-04	**1.15E-03**
Chloroform	1.97E-02	1.85E-04	1.08E-04	NA	5.85E-08	5.50E-06	7.55E-08	2.73E-06	NA	9.85E-03	9.25E-04	5.39E-04	NA	**NA**
Chloromethane (Methyl Chloride)	3.13E-02	2.94E-04	1.72E-04	NA	2.85E-08	2.68E-06	3.68E-08	1.33E-06	NA	1.57E-02	1.47E-03	8.56E-04	NA	**NA**
Ethylbenzene	1.72E-01	1.62E-03	9.42E-04	NA	3.38E-06	3.17E-04	4.36E-06	1.58E-04	NA	8.60E-02	8.08E-03	4.70E-03	NA	**NA**
Methylene chloride	1.29E-02	1.21E-04	7.07E-05	1.44E-06	1.58E-08	1.48E-06	2.04E-08	7.37E-07	1.66E-08	6.45E-03	6.06E-04	3.53E-04	1.53E-06	**2.99E-06**
Tetrachloroethane, 1,1,2,2-	2.50E-03	2.35E-05	1.37E-05	7.44E-06	1.03E-08	9.66E-07	1.33E-08	4.80E-07	2.89E-07	1.25E-03	1.17E-04	6.84E-05	NA	**7.73E-06**
Toluene	5.30E-01	4.98E-03	2.90E-03	NA	6.01E-06	5.64E-04	7.75E-06	2.80E-04	NA	2.65E-01	2.49E-02	1.45E-02	NA	**NA**
Xylenes	1.04E+00	9.77E-03	5.70E-03	NA	2.21E-05	2.07E-03	2.85E-05	1.03E-03	NA	5.20E-01	4.88E-02	2.84E-02	NA	**NA**
General Chemistry														
Nitrate-Nitrite	2.20E+00	2.07E-02	1.21E-02	NA	4.40E-07	4.13E-05	7.33E-07	2.65E-05	NA	NA	NA	NA	NA	**NA**
Total ILCR				**3.22E-03**					**2.18E-05**				**9.84E-04**	**4.22E-03**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram
mg/m^3- milligram per cubic meter

Table D-14

On-Site Child Resident, Future Scenario, Noncancer Hazard from Exposure to Bedrock Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			Inhalation of VOCs			**All**
		Child		Dose	Child		Concentration	Child		**Pathways**
	EPC	Dose		Absorbed	Dose		in Air	Dose		**Total**
Chemicals of Potential Concern	mg/L	mg/kg-day	HQ	mg/cm^2-day	mg/kg-day	HQ	mg/m^3	mg/kg-day	HQ	**HI**
Inorganics										
Arsenic	1.29E-01	8.25E-03	2.75E+01	4.30E-08	1.81E-05	6.04E-02	NA	NA	NA	**2.75E+01**
Chromium, Total	3.30E-03	2.11E-04	1.00E-02	1.10E-09	4.64E-07	1.72E-03	NA	NA	NA	**1.18E-02**
Iron	2.60E+00	1.66E-01	2.37E-01	8.66E-07	3.65E-04	NA	NA	NA	NA	**2.37E-01**
Manganese	8.60E-01	5.50E-02	1.17E+00	2.86E-07	1.21E-04	6.36E-02	NA	NA	NA	**1.23E+00**
Semivolatile Organic Compounds										
Methylnaphthalene, 2-	1.61E-02	1.03E-03	2.57E-01	9.30E-07	3.93E-04	9.81E-02	8.05E-03	5.14E-03	NA	**3.55E-01**
Naphthalene	1.95E-02	1.25E-03	6.23E-02	5.47E-07	2.31E-04	1.15E-02	9.75E-03	6.22E-03	7.24E+00	**7.31E+00**
Volatile Organic Compounds										
Benzene	4.03E-01	2.58E-02	6.44E+00	2.60E-06	1.10E-03	2.74E-01	2.02E-01	1.29E-01	1.50E+01	**2.17E+01**
Chloroform	1.97E-02	1.26E-03	1.26E-01	7.55E-08	3.19E-05	3.19E-03	9.85E-03	6.29E-03	4.49E-01	**5.78E-01**
Chloromethane (Methyl Chloride)	3.13E-02	2.00E-03	NA	3.68E-08	1.55E-05	NA	1.57E-02	9.99E-03	3.84E-01	**3.84E-01**
Ethylbenzene	1.72E-01	1.10E-02	1.10E-01	4.36E-06	1.84E-03	1.84E-02	8.60E-02	5.49E-02	1.89E-01	**3.18E-01**
Methylene chloride	1.29E-02	8.25E-04	1.37E-02	2.04E-08	8.59E-06	1.43E-04	6.45E-03	4.12E-03	1.37E-02	**2.76E-02**
Tetrachloroethane, 1,1,2,2-	2.50E-03	1.60E-04	3.20E-03	1.33E-08	5.60E-06	1.12E-04	1.25E-03	7.98E-04	NA	**3.31E-03**
Toluene	5.30E-01	3.39E-02	4.24E-01	7.75E-06	3.27E-03	4.09E-02	2.65E-01	1.69E-01	1.21E-01	**5.85E-01**
Xylenes	1.04E+00	6.65E-02	3.32E-01	2.85E-05	1.20E-02	6.01E-02	5.20E-01	3.32E-01	1.14E+01	**1.18E+01**
General Chemistry										
Nitrate-Nitrite	2.20E+00	1.41E-01	1.41E+00	7.33E-07	3.09E-04	3.09E-03	NA	NA	NA	**1.41E+00**
Total HI			**3.81E+01**			**6.35E-01**			**3.48E+01**	**7.35E+01**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram
mg/m^3- milligram per cubic meter

Table D-15

On-Site Adult Resident, Future Scenario, Noncancer Hazard from Exposure to Bedrock Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			Inhalation of VOCs			All
		Noncancer		Dose	Adult		Concentration	Adult		Pathways
Chemicals of Potential Concern	EPC mg/L	Dose mg/kg-day	HQ	Absorbed mg/cm^2-day	Dose mg/kg-day	HQ	in Air mg/m^3	Dose mg/kg-day	HQ	Total HI
Inorganics										
Arsenic	1.29E-01	3.53E-03	1.18E+01	2.58E-08	7.07E-06	2.36E-02	NA	NA	NA	**1.18E+01**
Chromium, Total	3.30E-03	9.04E-05	4.31E-03	6.60E-10	1.81E-07	6.70E-04	NA	NA	NA	**4.97E-03**
Iron	2.60E+00	7.12E-02	1.02E-01	5.20E-07	1.42E-04	NA	NA	NA	NA	**1.02E-01**
Manganese	8.60E-01	2.36E-02	5.01E-01	1.72E-07	4.71E-05	2.48E-02	NA	NA	NA	**5.26E-01**
Semivolatile Organic Compounds										
Methylnaphthalene, 2-	1.61E-02	4.41E-04	1.10E-01	7.21E-07	1.98E-04	4.94E-02	8.05E-03	2.20E-03	NA	**1.60E-01**
Naphthalene	1.95E-02	5.34E-04	2.67E-02	4.24E-07	1.16E-04	5.81E-03	9.75E-03	2.67E-03	3.10E+00	**3.14E+00**
Volatile Organic Compounds										
Benzene	4.03E-01	1.10E-02	2.76E+00	2.01E-06	5.51E-04	1.38E-01	2.02E-01	5.52E-02	6.42E+00	**9.31E+00**
Chloroform	1.97E-02	5.40E-04	5.40E-02	5.85E-08	1.60E-05	1.60E-03	9.85E-03	2.70E-03	1.93E-01	**2.48E-01**
Chloromethane (Methyl Chloride)	3.13E-02	8.58E-04	NA	2.85E-08	7.82E-06	NA	1.57E-02	4.29E-03	1.65E-01	**1.65E-01**
Ethylbenzene	1.72E-01	4.71E-03	4.71E-02	3.38E-06	9.25E-04	9.25E-03	8.60E-02	2.36E-02	8.12E-02	**1.38E-01**
Methylene chloride	1.29E-02	3.53E-04	5.89E-03	1.58E-08	4.32E-06	7.21E-05	6.45E-03	1.77E-03	5.89E-03	**1.19E-02**
Tetrachloroethane, 1,1,2,2-	2.50E-03	6.85E-05	1.37E-03	1.03E-08	2.82E-06	5.63E-05	1.25E-03	3.42E-04	NA	**1.43E-03**
Toluene	5.30E-01	1.45E-02	1.82E-01	6.01E-06	1.65E-03	2.06E-02	2.65E-01	7.26E-02	5.18E-02	**2.54E-01**
Xylenes	1.04E+00	2.85E-02	1.42E-01	2.21E-05	6.05E-03	3.02E-02	5.20E-01	1.42E-01	4.91E+00	**5.08E+00**
General Chemistry										
Nitrate-Nitrite	2.20E+00	6.03E-02	6.03E-01	4.40E-07	1.21E-04	1.21E-03	NA	NA	NA	**6.04E-01**
Total HI			**1.63E+01**			**3.05E-01**			**1.49E+01**	**3.16E+01**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram
mg/m^3- milligram per cubic meter

Table D-16

On-Site Resident, Future Scenario, Cancer Risk from Exposure to Overburden Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion			Dermal Contact					Inhalation of VOCs				**All**
		Adult	Child		Dose	Adult	Dose	Child		Concentration	Adult	Child		**Pathways**
Chemicals of Potential Concern	EPC mg/L	Dose mg/kg-day	Dose mg/kg-day	ILCR	Absorbed mg/cm^2-day	Dose mg/kg-day	Absorbed mg/cm^2-day	Dose mg/kg-day	ILCR	in Air mg/m^3	Dose mg/kg-day	Dose mg/kg-day	ILCR	**Total ILCR**
Inorganics														
Arsenic	6.90E-03	6.48E-05	3.78E-05	1.54E-04	1.38E-09	1.30E-07	2.30E-09	8.31E-08	3.19E-07	NA	NA	NA	NA	**1.54E-04**
Cobalt	1.10E-03	1.03E-05	6.03E-06	NA	8.80E-11	8.27E-09	1.47E-10	5.30E-09	NA	NA	NA	NA	NA	**NA**
Manganese	3.89E-01	3.65E-03	2.13E-03	NA	7.77E-08	7.30E-06	1.29E-07	4.68E-06	NA	NA	NA	NA	NA	**NA**
Nitroaromatics														
Dinitrotoluene, 2,4-	1.03E-03	9.71E-06	5.67E-06	1.05E-05	4.19E-09	3.94E-07	5.41E-09	1.96E-07	4.01E-07	5.17E-04	4.85E-05	2.83E-05	NA	**1.09E-05**
Dinitrotoluene, 2,6-	1.04E-03	9.73E-06	5.68E-06	1.05E-05	2.85E-09	2.67E-07	3.67E-09	1.33E-07	2.72E-07	5.18E-04	4.86E-05	2.83E-05	NA	**1.07E-05**
Semivolatile Organic Compounds														
Bis(2-ethylhexyl)phthalate	4.48E-03	4.20E-05	2.45E-05	9.32E-07	4.51E-07	4.24E-05	5.82E-07	2.11E-05	8.88E-07	2.24E-03	2.10E-04	1.22E-04	2.79E-06	**4.61E-06**
Total ILCR				**1.76E-04**					**1.88E-06**				**2.79E-06**	**1.81E-04**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram
mg/m^3- milligram per cubic meter

Table D-17

On-Site Child Resident, Future Scenario, Noncancer Hazard from Exposure to Overburden Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			Inhalation of VOCs			**All**
		Child		Dose	Child		Concentration	Child		**Pathways**
Chemicals of Potential Concern	EPC mg/L	Dose mg/kg-day	HQ	Absorbed mg/cm^2-day	Dose mg/kg-day	HQ	in Air mg/m^3	Dose mg/kg-day	HQ	**Total HI**
Inorganics										
Arsenic	6.90E-03	4.41E-04	1.47E+00	2.30E-09	9.70E-07	3.23E-03	NA	NA	NA	**1.47E+00**
Cobalt	1.10E-03	7.03E-05	2.34E-01	1.47E-10	6.18E-08	2.06E-04	NA	NA	NA	**2.35E-01**
Manganese	3.89E-01	2.48E-02	5.28E-01	1.29E-07	5.46E-05	2.87E-02	NA	NA	NA	**5.57E-01**
Nitroaromatics										
Dinitrotoluene, 2,4-	1.03E-03	6.61E-05	3.31E-02	5.41E-09	2.28E-06	1.14E-03	5.17E-04	3.30E-04	NA	**3.42E-02**
Dinitrotoluene, 2,6-	1.04E-03	6.62E-05	6.62E-02	3.67E-09	1.55E-06	1.55E-03	5.18E-04	3.31E-04	NA	**6.78E-02**
Semivolatile Organic Compounds										
Bis(2-ethylhexyl)phthalate	4.48E-03	2.86E-04	1.43E-02	5.82E-07	2.46E-04	1.23E-02	2.24E-03	1.43E-03	NA	**2.66E-02**
Total HI			**2.35E+00**			**4.71E-02**			**NA**	**2.39E+00**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram
mg/m^3- milligram per cubic meter

Table D-18

On-Site Adult Resident, Future Scenario, Noncancer Hazard from Exposure to Overburden Groundwater
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			Inhalation of VOCs			**All**
		Noncancer		Dose	Adult		Concentration	Adult		**Pathways**
Chemicals of Potential Concern	EPC mg/L	Dose mg/kg-day	HQ	Absorbed mg/cm^2-day	Dose mg/kg-day	HQ	in Air mg/m^3	Dose mg/kg-day	HQ	**Total HI**
Inorganics										
Arsenic	6.90E-03	1.89E-04	6.30E-01	1.38E-09	3.78E-07	1.26E-03	NA	NA	NA	**6.32E-01**
Cobalt	1.10E-03	3.01E-05	1.00E-01	8.80E-11	2.41E-08	8.04E-05	NA	NA	NA	**1.01E-01**
Manganese	3.89E-01	1.06E-02	2.26E-01	7.77E-08	2.13E-05	1.12E-02	NA	NA	NA	**2.38E-01**
Nitroaromatics										
Dinitrotoluene, 2,4-	1.03E-03	2.83E-05	1.42E-02	4.19E-09	1.15E-06	5.74E-04	5.17E-04	1.42E-04	NA	**1.47E-02**
Dinitrotoluene, 2,6-	1.04E-03	2.84E-05	2.84E-02	2.85E-09	7.80E-07	7.80E-04	5.18E-04	1.42E-04	NA	**2.92E-02**
Semivolatile Organic Compounds										
Bis(2-ethylhexyl)phthalate	4.48E-03	1.23E-04	6.13E-03	4.51E-07	1.24E-04	6.18E-03	2.24E-03	6.13E-04	NA	**1.23E-02**
Total HI			**1.01E+00**			**2.01E-02**			**NA**	**1.03E+00**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/L - milligram per liter
mg/cm^2 - milligram per square meter
mg/kg - milligram per kilogram
mg/m^3- milligram per cubic meter

Table D-19

On-Site Resident, Future Scenario, Cancer Risk from Exposure to Sediment
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion			Dermal Contact					**All**
		Adult	Child		Dose	Adult	Dose	Child		**Pathways**
Chemicals of Potential Concern	EPC mg/kg	Dose mg/kg-day	Dose mg/kg-day	Resident ILCR	Absorbed mg/cm^2-day	Dose mg/kg-day	Absorbed mg/cm^2-day	Dose mg/kg-day	Resident ILCR	**Total ILCR**
Inorganics										
Chromium, total	1.40E+01	6.58E-07	1.53E-06	NA	NA	NA	NA	NA	NA	**NA**
Total ILCR				**NA**					**NA**	**NA**

EPC - Exposure Point Concentration
ILCR - Incremental Lifetime Cancer Risk
mg/kg - milligram per kilogram
mg/cm^2 - milligram per centimeter squared

Table D-20

On-Site Child Resident, Future Scenario, Noncancer Risk from Exposure to Sediment
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			**All**
		Child		Dose	Child		**Pathways**
Chemicals of Potential Concern	EPC mg/kg	Dose mg/kg-day	Child HQ	Absorbed mg/cm^2-day	Dose mg/kg-day	Child HQ	**Total HI**
Inorganics							
Chromium, total	1.40E+01	1.79E-05	8.52E-04	NA	NA	NA	**8.52E-04**
Total HI			**8.52E-04**			**NA**	**8.52E-04**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/cm^2 - milligram per centimeter squared

Table D-21

On-Site Adult Resident, Future Scenario, Noncancer Risk from Exposure to Sediment
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion		Dermal Contact			**All**
		Adult		Dose	Adult		**Pathways**
	EPC	Dose	Adult	Absorbed	Dose	Adult	**Total**
Chemicals of Potential Concern	mg/kg	mg/kg-day	HQ	mg/cm^2-day	mg/kg-day	HQ	**HI**
Inorganics							
Chromium, total	1.40E+01	1.92E-06	9.13E-05	NA	NA	NA	**9.13E-05**
Total HI			**9.13E-05**			**NA**	**9.13E-05**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
mg/kg - milligram per kilogram
mg/cm^2 - milligram per centimeter squared

Table D-22

Adult Hunter, Future Scenario, Exposure to Surface Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

		Incidental Ingestion				Dermal Contact				
	EPC	Cancer Dose	Noncancer Dose	Adult Hunter	Adult Hunter	Dose Absorbed	Cancer Dose	Noncancer Dose	Adult Hunter	Adult Hunter
Chemicals of Potential Concern	mg/kg	mg/kg-day	mg/kg-day	ILCR	HQ	mg/cm^2-day	mg/kg-day	mg/kg-day	ILCR	HQ
Inorganics										
Vanadium	3.42E+01	8.03E-07	1.87E-06	NA	3.75E-04	NA	NA	NA	NA	NA
Polychlorinated biphenyls (PCB)										
Aroclor 1254	1.05E-01	2.47E-09	5.75E-09	4.93E-09	2.88E-04	2.94E-09	2.28E-09	5.32E-09	4.56E-09	2.66E-04
Explosives										
Trinitrotoluene, 2,4,6-	2.32E+01	5.45E-07	1.27E-06	1.64E-08	2.54E-03	1.49E-07	1.15E-07	2.69E-07	3.45E-09	5.37E-04
Semivolatile Organic Compounds										
Benzo(a)anthracene	2.12E-01	4.98E-09	1.16E-08	3.63E-09	NA	5.51E-09	4.27E-09	9.97E-09	3.12E-09	NA
Benzo(a)pyrene	2.03E-01	4.77E-09	1.11E-08	3.48E-08	NA	5.28E-09	4.09E-09	9.54E-09	2.99E-08	NA
Benzo(b)fluoranthene	2.68E-01	6.29E-09	1.47E-08	4.59E-09	NA	6.97E-09	5.40E-09	1.26E-08	3.94E-09	NA
Indeno(1,2,3-cd)pyrene	2.28E-01	5.35E-09	1.25E-08	3.91E-09	NA	5.93E-09	4.59E-09	1.07E-08	3.35E-09	NA
Total ILCR and HI				**6.82E-08**	**3.21E-03**				**4.83E-08**	**8.03E-04**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
ILCR - Incremental Lifetime Cancer Risk
mg/kg - milligram per kilogram
mg/cm^2 - milligram per square meter

Table D-22

Adult Hunter, Future Scenario, Exposure to Surface Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

Chemicals of Potential Concern	Concentration in Forage C_p mg/kg	Concentration in Venison C_v mg/kg	Consumption of Venison: Cancer Dose mg/kg-day	Consumption of Venison: Noncancer Dose mg/kg-day	ILCR	HQ	**All Pathways: Total ILCR**	**All Pathways: Total HI**
Inorganics								
Vanadium	NA	NA	NA	NA	NA	NA	**NA**	**3.75E-04**
Polychlorinated biphenyls (PCB)								
Aroclor 1254	8.90E-04	3.69E-07	2.81E-11	6.57E-11	5.63E-11	3.28E-06	**9.54E-09**	**5.57E-04**
Explosives								
Trinitrotoluene, 2,4,6-	NA	NA	NA	NA	NA	NA	**1.98E-08**	**3.08E-03**
Semivolatile Organic Compounds								
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	**6.75E-09**	**NA**
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	**6.47E-08**	**NA**
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	**8.54E-09**	**NA**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	**7.26E-09**	**NA**
Total ILCR and HI					**5.63E-11**	**3.28E-06**	**1.17E-07**	**4.01E-03**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
ILCR - Incremental Lifetime Cancer Risk
mg/kg - milligram per kilogram
mg/cm^2 - milligram per square meter

Table D-23

Hunter's Child, Future Scenario, Exposure to Surface Soil
Waste Water Treatment Plant 1, Plum Brook Ordnance Works
Sandusky, Ohio

Chemicals of Potential Concern	EPC mg/kg	Concentration in Forage C_p mg/kg	Concentration in Venison C_v mg/kg	Consumption of Venison: Cancer Dose mg/kg-day	Consumption of Venison: Noncancer Dose mg/kg-day	ILCR	HQ	**Total ILCR**	**Total HI**
Inorganics									
Vanadium	3.42E+01	NA	NA	NA	NA	NA	NA	**NA**	**NA**
Polychlorinated biphenyls (PCB)									
Aroclor 1254	1.05E-01	8.90E-04	3.69E-07	1.01E-11	1.18E-10	2.02E-11	5.89E-06	**2.02E-11**	**5.89E-06**
Explosives									
Trinitrotoluene, 2,4,6-	2.32E+01	NA	NA	NA	NA	NA	NA	**NA**	**NA**
Semivolatile Organic Compounds									
Benzo(a)anthracene	2.12E-01	NA	NA	NA	NA	NA	NA	**NA**	**NA**
Benzo(a)pyrene	2.03E-01	NA	NA	NA	NA	NA	NA	**NA**	**NA**
Benzo(b)fluoranthene	2.68E-01	NA	NA	NA	NA	NA	NA	**NA**	**NA**
Indeno(1,2,3-cd)pyrene	2.28E-01	NA	NA	NA	NA	NA	NA	**NA**	**NA**
Total ILCR and HI						**2.02E-11**	**5.89E-06**	**2.02E-11**	**5.89E-06**

EPC - Exposure Point Concentration
HQ - Hazard Quotient; HI - Hazard Index
ILCR - Incremental Lifetime Cancer Risk
mg/kg - milligram per kilogram

APPENDIX E

ANALYTICAL DATA USED IN BASELINE HUMAN HEALTH RISK ASSESSMENT

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

PARAMETER	CASNUM	RES	UNIT	REP_LIM	VQUAL	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METH_DET_LIM	LAB_QUAL
Acenaphthene	83-32-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthene	83-32-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Acenaphthene	83-32-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Acenaphthene	83-32-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthene	83-32-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00722	U
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00721	U
Acenaphthene	83-32-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00686	U
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00721	U
Acenaphthene	83-32-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00674	U
Acenaphthene	83-32-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00729	UU
Acenaphthene	83-32-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00674	U
Acenaphthene	83-32-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00687	U
Acenaphthylene	208-96-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthylene	208-96-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Acenaphthylene	208-96-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Acenaphthylene	208-96-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthylene	208-96-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00482	U
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00481	U
Acenaphthylene	208-96-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00457	U
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00481	U
Acenaphthylene	208-96-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00449	U
Acenaphthylene	208-96-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00486	UU
Acenaphthylene	208-96-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00449	U
Acenaphthylene	208-96-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00458	U
Acetone	67-64-1	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
Acetone	67-64-1	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013	U
Acetone	67-64-1	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
Aluminum	7429-90-5	4340	mg/kg	21.8		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	21.8	
Aluminum	7429-90-5	5560	mg/kg	26.5		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	26.5	
Aluminum	7429-90-5	4960	mg/kg	22.2		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	22.2	
Aluminum	7429-90-5	8020	mg/kg	26.8		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	26.8	
Aluminum	7429-90-5	2840	mg/kg	1.76		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.88	
Aluminum	7429-90-5	6820	mg/kg	1.69		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.843	
Aluminum	7429-90-5	3400	mg/kg	1.61		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.804	
Aluminum	7429-90-5	4610	mg/kg	1.88		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.938	
Aluminum	7429-90-5	5310	mg/kg	1.89		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.944	
Aluminum	7429-90-5	5980	mg/kg	1.93		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.9645	
Aluminum	7429-90-5	4850	mg/kg	1.68		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.842	
Aluminum	7429-90-5	6230	mg/kg	1.93		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.963	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.33	mg/kg	0.25		PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.66	mg/kg	0.25		PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.375	mg/kg	0.75	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	8.06	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.154	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		J
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.17	mg/kg		J	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.31	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.29	mg/kg	0.25		PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.74	mg/kg	0.25		PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	1.84	mg/kg			PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		
Amino-4,6-dinitrotoluene, 2-	35572-78-2	6.02	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.0932	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		J
Amino-4,6-dinitrotoluene, 2-	35572-78-2	1.46	mg/kg			PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	3.09	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.185	mg/kg	0.294	J	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	J
Anthracene	120-12-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Anthracene	120-12-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Anthracene	120-12-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Anthracene	120-12-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Anthracene	120-12-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00867	U
Anthracene	120-12-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00865	U
Anthracene	120-12-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00823	U
Anthracene	120-12-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00866	U
Anthracene	120-12-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00809	U
Anthracene	120-12-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008745	UU
Anthracene	120-12-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00809	U
Anthracene	120-12-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00824	U
Antimony	7440-36-0	0.55	mg/kg	1.1	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.1	U
Antimony	7440-36-0	0.65	mg/kg	1.3	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	1.3	U
Antimony	7440-36-0	0.55	mg/kg	1.1	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.1	U
Antimony	7440-36-0	3.9	mg/kg	1.3		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	1.3	
Antimony	7440-36-0	0.245	mg/kg	0.49	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245	U
Antimony	7440-36-0	0.211	mg/kg	0.422	UJ	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	U
Antimony	7440-36-0	0.421	mg/kg	0.402	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	
Antimony	7440-36-0	0.299	mg/kg	0.484	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242	J

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Antimony	7440-36-0	0.236	mg/kg	0.472	UJ	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	U
Antimony	7440-36-0	1.2835	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	
Antimony	7440-36-0	0.2285	mg/kg	0.457	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229	U
Antimony	7440-36-0	0.241	mg/kg	0.482	UJ	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	U
Aroclor 1016	12674-11-2	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1016	12674-11-2	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1016	12674-11-2	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1016	12674-11-2	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1016	12674-11-2	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1016	12674-11-2	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1016	12674-11-2	0.02	mg/kg	0.04	UJ	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1016	12674-11-2	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1016	12674-11-2	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1016	12674-11-2	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1016	12674-11-2	0.0294	mg/kg	0.0376	J	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	P,J
Aroclor 1221	11104-28-2	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1221	11104-28-2	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1221	11104-28-2	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1221	11104-28-2	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1221	11104-28-2	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1221	11104-28-2	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1221	11104-28-2	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1221	11104-28-2	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1221	11104-28-2	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1221	11104-28-2	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1221	11104-28-2	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1232	11141-16-5	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1232	11141-16-5	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1232	11141-16-5	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1232	11141-16-5	0.0328	mg/kg	0.0402	J	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	P,J
Aroclor 1232	11141-16-5	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1232	11141-16-5	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1232	11141-16-5	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1232	11141-16-5	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1232	11141-16-5	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1232	11141-16-5	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1232	11141-16-5	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1242	53469-21-9	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1242	53469-21-9	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1242	53469-21-9	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1242	53469-21-9	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1242	53469-21-9	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1242	53469-21-9	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1242	53469-21-9	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1242	53469-21-9	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1242	53469-21-9	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1242	53469-21-9	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1242	53469-21-9	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1248	12672-29-6	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1248	12672-29-6	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Aroclor 1248	12672-29-6	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1248	12672-29-6	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1248	12672-29-6	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1248	12672-29-6	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1248	12672-29-6	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1248	12672-29-6	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1248	12672-29-6	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1248	12672-29-6	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1248	12672-29-6	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1254	11097-69-1	0.18	mg/kg	0.036		PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	
Aroclor 1254	11097-69-1	0.085	mg/kg	0.044		PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	
Aroclor 1254	11097-69-1	0.074	mg/kg	0.037		PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	
Aroclor 1254	11097-69-1	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1254	11097-69-1	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1254	11097-69-1	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1254	11097-69-1	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1254	11097-69-1	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1254	11097-69-1	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1254	11097-69-1	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1254	11097-69-1	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1260	11096-82-5	0.11	mg/kg	0.036		PBOW99-SSW102	PBOW99SSW102	PCB	REG	10-Jun-99	0.5	1	0.036	
Aroclor 1260	11096-82-5	0.05	mg/kg	0.044		PBOW99-SSW103	PBOW99SSW103	PCB	REG	10-Jun-99	0.5	1	0.044	
Aroclor 1260	11096-82-5	0.047	mg/kg	0.037		PBOW99-SSW106	PBOW99SSW106	PCB	REG	10-Jun-99	0.5	1	0.037	
Aroclor 1260	11096-82-5	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1260	11096-82-5	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1260	11096-82-5	0.041	mg/kg	0.0388	J	WWTP1-SB03	WW0008	PCB	REG	4-Dec-08	1.2	2.2	0.00778	P
Aroclor 1260	11096-82-5	0.02	mg/kg	0.04	UJ	WWTP1-SB04	WW0011	PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1260	11096-82-5	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1260	11096-82-5	0.1235	mg/kg	0.0404		WWTP1-SB06	WW0018WW0017	PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	
Aroclor 1260	11096-82-5	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1260	11096-82-5	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Arsenic	7440-38-2	3.2	mg/kg	1.1		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	1.1	
Arsenic	7440-38-2	4.2	mg/kg	1.1		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.1	
Arsenic	7440-38-2	3	mg/kg	1.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	1.3	
Arsenic	7440-38-2	4	mg/kg	1.1		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	1.1	
Arsenic	7440-38-2	4.1	mg/kg	1.1		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	1.1	
Arsenic	7440-38-2	3.2	mg/kg	1.1		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.1	
Arsenic	7440-38-2	4.5	mg/kg	1.2		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	1.2	
Arsenic	7440-38-2	4.35	mg/kg	1.2		PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	1.2	
Arsenic	7440-38-2	3.8	mg/kg	1.1		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	1.1	
Arsenic	7440-38-2	2.43	mg/kg	0.979		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.49	
Arsenic	7440-38-2	2.55	mg/kg	0.843		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.422	
Arsenic	7440-38-2	2.15	mg/kg	0.804		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.402	
Arsenic	7440-38-2	2.96	mg/kg	0.968		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.484	
Arsenic	7440-38-2	1.78	mg/kg	0.944		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.472	
Arsenic	7440-38-2	2.275	mg/kg	0.9645		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.4825	
Arsenic	7440-38-2	0.998	mg/kg	0.915		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.457	
Arsenic	7440-38-2	2.02	mg/kg	0.963		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.482	
Barium	7440-39-3	25	mg/kg	22.6		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	22.6	
Barium	7440-39-3	27.1	mg/kg	21.8		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	21.8	

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Barium	7440-39-3	13.25	mg/kg	26.5	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	26.5 U
Barium	7440-39-3	23.1	mg/kg	21.7		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	21.7
Barium	7440-39-3	29.9	mg/kg	22.3		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	22.3
Barium	7440-39-3	24.6	mg/kg	22.2		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	22.2
Barium	7440-39-3	31.9	mg/kg	24.2		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	24.2
Barium	7440-39-3	35.75	mg/kg	24.25		PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	24.25
Barium	7440-39-3	28.2	mg/kg	22.6		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	22.6
Barium	7440-39-3	14.2	mg/kg	0.176		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088
Barium	7440-39-3	17.2	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843
Barium	7440-39-3	20.7	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804
Barium	7440-39-3	14.4	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938
Barium	7440-39-3	13.9	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944
Barium	7440-39-3	17.15	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645
Barium	7440-39-3	15	mg/kg	0.168		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842
Barium	7440-39-3	19.7	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963
Benzene	71-43-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Benzene	71-43-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Benzene	71-43-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Benzo(a)anthracene	56-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(a)anthracene	56-55-3	0.51	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Benzo(a)anthracene	56-55-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Benzo(a)anthracene	56-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(a)anthracene	56-55-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0264 U
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0263 U
Benzo(a)anthracene	56-55-3	0.122	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.025 J
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0263 U
Benzo(a)anthracene	56-55-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0246 U
Benzo(a)anthracene	56-55-3	0.04435	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0266 JJ
Benzo(a)anthracene	56-55-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0246 U
Benzo(a)anthracene	56-55-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0251 U
Benzo(a)pyrene	50-32-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(a)pyrene	50-32-8	0.42	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Benzo(a)pyrene	50-32-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Benzo(a)pyrene	50-32-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(a)pyrene	50-32-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0264 U
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0263 U
Benzo(a)pyrene	50-32-8	0.115	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.025 J
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0263 U
Benzo(a)pyrene	50-32-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0246 U
Benzo(a)pyrene	50-32-8	0.1209	mg/kg	0.4045	JU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0266 JU
Benzo(a)pyrene	50-32-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0246 U
Benzo(a)pyrene	50-32-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0251 U
Benzo(b)fluoranthene	205-99-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(b)fluoranthene	205-99-2	0.55	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Benzo(b)fluoranthene	205-99-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Benzo(b)fluoranthene	205-99-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(b)fluoranthene	205-99-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0668 U
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0667 U
Benzo(b)fluoranthene	205-99-2	0.182	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0634 J
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0667 U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Benzo(b)fluoranthene	205-99-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0624	U
Benzo(b)fluoranthene	205-99-2	0.13715	mg/kg	0.4045	JU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0674	JU
Benzo(b)fluoranthene	205-99-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0623	U
Benzo(b)fluoranthene	205-99-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0635	U
Benzo(ghi)perylene	191-24-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(ghi)perylene	191-24-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Benzo(ghi)perylene	191-24-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Benzo(ghi)perylene	191-24-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(ghi)perylene	191-24-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0977	U
Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0976	U
Benzo(ghi)perylene	191-24-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0928	U
Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0976	U
Benzo(ghi)perylene	191-24-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0912	U
Benzo(ghi)perylene	191-24-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0986	UU
Benzo(ghi)perylene	191-24-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0912	U
Benzo(ghi)perylene	191-24-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0929	U
Benzo(k)fluoranthene	207-08-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(k)fluoranthene	207-08-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Benzo(k)fluoranthene	207-08-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Benzo(k)fluoranthene	207-08-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(k)fluoranthene	207-08-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.122	U
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.121	U
Benzo(k)fluoranthene	207-08-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.115	U
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.121	U
Benzo(k)fluoranthene	207-08-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.113	U
Benzo(k)fluoranthene	207-08-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1225	UU
Benzo(k)fluoranthene	207-08-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.113	U
Benzo(k)fluoranthene	207-08-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.116	U
Benzoic acid	65-85-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0977	U
Benzoic acid	65-85-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0976	U
Benzoic acid	65-85-0	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0928	U
Benzoic acid	65-85-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0976	U
Benzoic acid	65-85-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0912	U
Benzoic acid	65-85-0	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0986	UU
Benzoic acid	65-85-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0912	U
Benzoic acid	65-85-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0929	U
Benzyl alcohol	100-51-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0977	U
Benzyl alcohol	100-51-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0976	U
Benzyl alcohol	100-51-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0928	U
Benzyl alcohol	100-51-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0976	U
Benzyl alcohol	100-51-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0912	U
Benzyl alcohol	100-51-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0986	UU
Benzyl alcohol	100-51-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0912	U
Benzyl alcohol	100-51-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0929	U
Beryllium	7440-41-7	0.275	mg/kg	0.55	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55	U
Beryllium	7440-41-7	0.33	mg/kg	0.66	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66	U
Beryllium	7440-41-7	0.275	mg/kg	0.55	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55	U
Beryllium	7440-41-7	0.335	mg/kg	0.67	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	0.67	U
Beryllium	7440-41-7	4.48	mg/kg	0.176	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088	
Beryllium	7440-41-7	6.36	mg/kg	0.169	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843	

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Beryllium	7440-41-7	4.21	mg/kg	0.161	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804	
Beryllium	7440-41-7	5.67	mg/kg	0.188	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938	
Beryllium	7440-41-7	8.44	mg/kg	0.189	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944	
Beryllium	7440-41-7	5.49	mg/kg	0.193	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645	
Beryllium	7440-41-7	6.3	mg/kg	0.168	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842	
Beryllium	7440-41-7	4.73	mg/kg	0.193	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963	
Bis(2-chloroethoxy)methane	111-91-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethoxy)methane	111-91-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-chloroethoxy)methane	111-91-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-chloroethoxy)methane	111-91-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethoxy)methane	111-91-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00843	U
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00841	U
Bis(2-chloroethoxy)methane	111-91-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.008	U
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00842	U
Bis(2-chloroethoxy)methane	111-91-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00787	U
Bis(2-chloroethoxy)methane	111-91-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008505	UU
Bis(2-chloroethoxy)methane	111-91-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00786	U
Bis(2-chloroethoxy)methane	111-91-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00801	U
Bis(2-chloroethyl)ether	111-44-4	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethyl)ether	111-44-4	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-chloroethyl)ether	111-44-4	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-chloroethyl)ether	111-44-4	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethyl)ether	111-44-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00972	U
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00955	U
Bis(2-chloroethyl)ether	111-44-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01035	UU
Bis(2-chloroethyl)ether	111-44-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00954	U
Bis(2-chloroethyl)ether	111-44-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00973	U
Bis(2-chloroisopropyl)ether	108-60-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroisopropyl)ether	108-60-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-chloroisopropyl)ether	108-60-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-chloroisopropyl)ether	108-60-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroisopropyl)ether	108-60-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0175	U
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0174	U
Bis(2-chloroisopropyl)ether	108-60-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0166	U
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0174	U
Bis(2-chloroisopropyl)ether	108-60-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0163	U
Bis(2-chloroisopropyl)ether	108-60-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0176	UU
Bis(2-chloroisopropyl)ether	108-60-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0163	U
Bis(2-chloroisopropyl)ether	108-60-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0166	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0371	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.037	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0352	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.037	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Bis(2-ethylhexyl)phthalate	117-81-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0346	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03745	UU
Bis(2-ethylhexyl)phthalate	117-81-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0346	U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0353	U
Bromodichloromethane	75-27-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Bromodichloromethane	75-27-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Bromodichloromethane	75-27-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Bromoform	75-25-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Bromoform	75-25-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Bromoform	75-25-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Bromomethane	74-83-9	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Bromomethane	74-83-9	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Bromomethane	74-83-9	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Bromophenyl phenyl ether, 4-	101-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bromophenyl phenyl ether, 4-	101-55-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bromophenyl phenyl ether, 4-	101-55-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bromophenyl phenyl ether, 4-	101-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bromophenyl phenyl ether, 4-	101-55-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0143	U
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0143	U
Bromophenyl phenyl ether, 4-	101-55-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0136	U
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0143	U
Bromophenyl phenyl ether, 4-	101-55-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0134	U
Bromophenyl phenyl ether, 4-	101-55-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01445	UU
Bromophenyl phenyl ether, 4-	101-55-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0134	U
Bromophenyl phenyl ether, 4-	101-55-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0136	U
Butanone, 2-	78-93-3	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
Butanone, 2-	78-93-3	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013	U
Butanone, 2-	78-93-3	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
Butyl benzyl phthalate	85-68-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Butyl benzyl phthalate	85-68-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Butyl benzyl phthalate	85-68-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Butyl benzyl phthalate	85-68-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Butyl benzyl phthalate	85-68-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0163	U
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0162	U
Butyl benzyl phthalate	85-68-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0154	U
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0162	U
Butyl benzyl phthalate	85-68-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0152	U
Butyl benzyl phthalate	85-68-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0164	UU
Butyl benzyl phthalate	85-68-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0152	U
Butyl benzyl phthalate	85-68-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0155	U
Cadmium	7440-43-9	0.115	mg/kg	0.23	U	PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.23	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.135	mg/kg	0.27	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.27	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.12	mg/kg	0.24	U	PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.24	U
Cadmium	7440-43-9	0.1225	mg/kg	0.245	UU	PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	0.245	UU
Cadmium	7440-43-9	0.115	mg/kg	0.23	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.23	U
Cadmium	7440-43-9	0.245	mg/kg	0.49	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245	U

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Cadmium	7440-43-9	0.211	mg/kg	0.422	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211 U
Cadmium	7440-43-9	0.201	mg/kg	0.402	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201 U
Cadmium	7440-43-9	0.242	mg/kg	0.484	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242 U
Cadmium	7440-43-9	0.236	mg/kg	0.472	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236 U
Cadmium	7440-43-9	0.508	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241 J
Cadmium	7440-43-9	0.2285	mg/kg	0.457	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229 U
Cadmium	7440-43-9	0.241	mg/kg	0.482	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241 U
Calcium	7440-70-2	9030	mg/kg	546		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546
Calcium	7440-70-2	3380	mg/kg	663		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663
Calcium	7440-70-2	7770	mg/kg	555		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555
Calcium	7440-70-2	20100	mg/kg	670		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670
Calcium	7440-70-2	15200	mg/kg	4.4	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	2.2
Calcium	7440-70-2	1810	mg/kg	4.22		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	2.11
Calcium	7440-70-2	8260	mg/kg	4.02		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	2.01
Calcium	7440-70-2	3880	mg/kg	4.69		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	2.35
Calcium	7440-70-2	1790	mg/kg	4.72		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	2.36
Calcium	7440-70-2	2345	mg/kg	4.825		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	2.41
Calcium	7440-70-2	1910	mg/kg	4.21	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	2.1
Calcium	7440-70-2	1830	mg/kg	4.82		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	2.41
Carbazole	86-74-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Carbazole	86-74-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Carbazole	86-74-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Carbazole	86-74-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Carbazole	86-74-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0401 U
Carbazole	86-74-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.04 U
Carbazole	86-74-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0381 U
Carbazole	86-74-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.04 U
Carbazole	86-74-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0374 U
Carbazole	86-74-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.04045 UU
Carbazole	86-74-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0374 U
Carbazole	86-74-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0381 U
Carbon disulfide	75-15-0	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Carbon disulfide	75-15-0	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Carbon disulfide	75-15-0	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Carbon tetrachloride	56-23-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Carbon tetrachloride	56-23-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Carbon tetrachloride	56-23-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloro-3-methylphenol, 4-	59-50-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloro-3-methylphenol, 4-	59-50-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chloro-3-methylphenol, 4-	59-50-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chloro-3-methylphenol, 4-	59-50-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloro-3-methylphenol, 4-	59-50-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00987 U
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00986 U
Chloro-3-methylphenol, 4-	59-50-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00937 U
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00986 U
Chloro-3-methylphenol, 4-	59-50-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00921 U
Chloro-3-methylphenol, 4-	59-50-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00996 UU
Chloro-3-methylphenol, 4-	59-50-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00921 U
Chloro-3-methylphenol, 4-	59-50-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00939 U
Chloroaniline, 4-	106-47-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Chloroaniline, 4-	106-47-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chloroaniline, 4-	106-47-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chloroaniline, 4-	106-47-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloroaniline, 4-	106-47-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0348 U
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0347 U
Chloroaniline, 4-	106-47-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.033 U
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0347 U
Chloroaniline, 4-	106-47-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0325 U
Chloroaniline, 4-	106-47-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03515 UU
Chloroaniline, 4-	106-47-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0325 U
Chloroaniline, 4-	106-47-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0331 U
Chlorobenzene	108-90-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chlorobenzene	108-90-7	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chlorobenzene	108-90-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroethane	75-00-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroethane	75-00-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chloroethane	75-00-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroform	67-66-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroform	67-66-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chloroform	67-66-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloromethane	74-87-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloromethane	74-87-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chloromethane	74-87-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloronaphthalene, 2-	91-58-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloronaphthalene, 2-	91-58-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chloronaphthalene, 2-	91-58-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chloronaphthalene, 2-	91-58-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloronaphthalene, 2-	91-58-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00638 U
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00637 U
Chloronaphthalene, 2-	91-58-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00606 U
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00637 U
Chloronaphthalene, 2-	91-58-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00596 U
Chloronaphthalene, 2-	91-58-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.006435 UU
Chloronaphthalene, 2-	91-58-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00595 U
Chloronaphthalene, 2-	91-58-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00607 U
Chlorophenol, 2-	95-57-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenol, 2-	95-57-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chlorophenol, 2-	95-57-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chlorophenol, 2-	95-57-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenol, 2-	95-57-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00494 U
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00493 U
Chlorophenol, 2-	95-57-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00469 U
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00493 U
Chlorophenol, 2-	95-57-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00461 U
Chlorophenol, 2-	95-57-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00498 UU
Chlorophenol, 2-	95-57-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0046 U
Chlorophenol, 2-	95-57-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00469 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U

Table E-1
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Chlorophenyl phenyl ether, 4-	7005-72-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0307	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0306	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0291	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0307	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0287	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03095	UU
Chlorophenyl phenyl ether, 4-	7005-72-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0286	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0292	U
Chromium	7440-47-3	9.9	mg/kg	0.56		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.56	
Chromium	7440-47-3	7.8	mg/kg	0.55		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55	
Chromium	7440-47-3	6.8	mg/kg	0.66		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66	
Chromium	7440-47-3	9.9	mg/kg	0.54		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.54	
Chromium	7440-47-3	14.9	mg/kg	0.56		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.56	
Chromium	7440-47-3	7.6	mg/kg	0.55		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55	
Chromium	7440-47-3	15.9	mg/kg	0.61		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.61	
Chromium	7440-47-3	12.85	mg/kg	0.605		PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	0.605	
Chromium	7440-47-3	12.4	mg/kg	0.56		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.56	
Chromium	7440-47-3	9.05	mg/kg	0.44		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.22	
Chromium	7440-47-3	15.7	mg/kg	0.422	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	
Chromium	7440-47-3	10.9	mg/kg	0.402	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	
Chromium	7440-47-3	13	mg/kg	0.469	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.235	
Chromium	7440-47-3	17.6	mg/kg	0.472	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	
Chromium	7440-47-3	13.55	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	
Chromium	7440-47-3	12.2	mg/kg	0.421		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.21	
Chromium	7440-47-3	11.7	mg/kg	0.482	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	
Chrysene	218-01-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Chrysene	218-01-9	0.45	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	
Chrysene	218-01-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Chrysene	218-01-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Chrysene	218-01-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0159	U
Chrysene	218-01-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0159	U
Chrysene	218-01-9	0.117	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0151	J
Chrysene	218-01-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0159	U
Chrysene	218-01-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0148	U
Chrysene	218-01-9	0.0496	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01605	JJ
Chrysene	218-01-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0148	U
Chrysene	218-01-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0151	U
Cobalt	7440-48-4	2.75	mg/kg	5.5	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	5.5	U
Cobalt	7440-48-4	3.3	mg/kg	6.6	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	6.6	U
Cobalt	7440-48-4	2.75	mg/kg	5.5	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	5.5	U
Cobalt	7440-48-4	3.35	mg/kg	6.7	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	6.7	U
Cobalt	7440-48-4	4.56	mg/kg	0.176	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088	
Cobalt	7440-48-4	4.27	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843	
Cobalt	7440-48-4	3.61	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804	
Cobalt	7440-48-4	3.41	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938	
Cobalt	7440-48-4	4.83	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944	
Cobalt	7440-48-4	3.125	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645	
Cobalt	7440-48-4	5.26	mg/kg	0.168	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842	
Cobalt	7440-48-4	3.15	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963	

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Copper	7440-50-8	10.3	mg/kg	2.7		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	2.7
Copper	7440-50-8	5.1	mg/kg	3.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	3.3
Copper	7440-50-8	5	mg/kg	2.8		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	2.8
Copper	7440-50-8	9.5	mg/kg	3.3		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	3.3
Copper	7440-50-8	4.64	mg/kg	0.44		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.22
Copper	7440-50-8	4.03	mg/kg	0.422		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211
Copper	7440-50-8	6.46	mg/kg	0.402		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201
Copper	7440-50-8	3.92	mg/kg	0.469		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.235
Copper	7440-50-8	4.28	mg/kg	0.472		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236
Copper	7440-50-8	12.4	mg/kg	0.4825		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241
Copper	7440-50-8	5.3	mg/kg	0.421		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.21
Copper	7440-50-8	3.26	mg/kg	0.482		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241
Dibenz(a,h)anthracene	53-70-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dibenz(a,h)anthracene	53-70-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dibenz(a,h)anthracene	53-70-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dibenz(a,h)anthracene	53-70-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dibenz(a,h)anthracene	53-70-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0906 U
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0905 U
Dibenz(a,h)anthracene	53-70-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0861 U
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0905 U
Dibenz(a,h)anthracene	53-70-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0846 U
Dibenz(a,h)anthracene	53-70-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.09145 UU
Dibenz(a,h)anthracene	53-70-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0846 U
Dibenz(a,h)anthracene	53-70-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0862 U
Dibenzofuran	132-64-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dibenzofuran	132-64-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dibenzofuran	132-64-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dibenzofuran	132-64-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dibenzofuran	132-64-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00674 U
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00673 U
Dibenzofuran	132-64-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0064 U
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00673 U
Dibenzofuran	132-64-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00629 U
Dibenzofuran	132-64-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0068 UU
Dibenzofuran	132-64-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00629 U
Dibenzofuran	132-64-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00641 U
Dibromochloromethane	124-48-1	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dibromochloromethane	124-48-1	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dibromochloromethane	124-48-1	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichlorobenzene, 1,2-	95-50-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,2-	95-50-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dichlorobenzene, 1,2-	95-50-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dichlorobenzene, 1,2-	95-50-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,2-	95-50-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00927 U
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00925 U
Dichlorobenzene, 1,2-	95-50-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0088 U
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00926 U
Dichlorobenzene, 1,2-	95-50-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00865 U
Dichlorobenzene, 1,2-	95-50-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00935 UU
Dichlorobenzene, 1,2-	95-50-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00865 U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dichlorobenzene, 1,2-	95-50-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00881	U
Dichlorobenzene, 1,3-	541-73-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorobenzene, 1,3-	541-73-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dichlorobenzene, 1,3-	541-73-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dichlorobenzene, 1,3-	541-73-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorobenzene, 1,3-	541-73-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0146	U
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0145	U
Dichlorobenzene, 1,3-	541-73-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0138	U
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0145	U
Dichlorobenzene, 1,3-	541-73-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0136	U
Dichlorobenzene, 1,3-	541-73-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0147	UU
Dichlorobenzene, 1,3-	541-73-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0136	U
Dichlorobenzene, 1,3-	541-73-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0138	U
Dichlorobenzene, 1,4-	106-46-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorobenzene, 1,4-	106-46-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dichlorobenzene, 1,4-	106-46-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dichlorobenzene, 1,4-	106-46-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorobenzene, 1,4-	106-46-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00782	U
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00781	U
Dichlorobenzene, 1,4-	106-46-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00743	U
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00781	U
Dichlorobenzene, 1,4-	106-46-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0073	U
Dichlorobenzene, 1,4-	106-46-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.007895	UU
Dichlorobenzene, 1,4-	106-46-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0073	U
Dichlorobenzene, 1,4-	106-46-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00744	U
Dichlorobenzidine, 3,3'-	91-94-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorobenzidine, 3,3'-	91-94-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dichlorobenzidine, 3,3'-	91-94-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dichlorobenzidine, 3,3'-	91-94-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorobenzidine, 3,3'-	91-94-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0397	U
Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0397	U
Dichlorobenzidine, 3,3'-	91-94-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0377	U
Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0397	U
Dichlorobenzidine, 3,3'-	91-94-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0371	U
Dichlorobenzidine, 3,3'-	91-94-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0401	UU
Dichlorobenzidine, 3,3'-	91-94-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0371	U
Dichlorobenzidine, 3,3'-	91-94-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0378	U
Dichloroethane, 1,1-	75-34-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethane, 1,1-	75-34-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloroethane, 1,1-	75-34-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethane, 1,2-	107-06-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethane, 1,2-	107-06-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloroethane, 1,2-	107-06-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethene, 1,1-	75-35-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethene, 1,1-	75-35-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloroethene, 1,1-	75-35-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethene, cis-1,2-	156-59-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethene, cis-1,2-	156-59-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloroethene, cis-1,2-	156-59-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloroethene, trans-1,2-	156-60-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dichloroethene, trans-1,2-	156-60-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloroethene, trans-1,2-	156-60-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichlorophenol, 2,4-	120-83-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorophenol, 2,4-	120-83-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dichlorophenol, 2,4-	120-83-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dichlorophenol, 2,4-	120-83-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dichlorophenol, 2,4-	120-83-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0143	U
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0143	U
Dichlorophenol, 2,4-	120-83-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0136	U
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0143	U
Dichlorophenol, 2,4-	120-83-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0134	U
Dichlorophenol, 2,4-	120-83-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01445	UU
Dichlorophenol, 2,4-	120-83-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0134	U
Dichlorophenol, 2,4-	120-83-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0136	U
Dichloropropane, 1,2-	78-87-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloropropane, 1,2-	78-87-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloropropane, 1,2-	78-87-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloropropene, cis-1,3-	10061-01-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloropropene, cis-1,3-	10061-01-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloropropene, cis-1,3-	10061-01-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloropropene, trans-1,3-	10061-02-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Dichloropropene, trans-1,3-	10061-02-6	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Dichloropropene, trans-1,3-	10061-02-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Diethyl phthalate	84-66-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Diethyl phthalate	84-66-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Diethyl phthalate	84-66-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Diethyl phthalate	84-66-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Diethyl phthalate	84-66-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0163	U
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0162	U
Diethyl phthalate	84-66-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0154	U
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0162	U
Diethyl phthalate	84-66-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0152	U
Diethyl phthalate	84-66-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0164	UU
Diethyl phthalate	84-66-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0152	U
Diethyl phthalate	84-66-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0155	U
Dimethyl phthalate	131-11-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dimethyl phthalate	131-11-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dimethyl phthalate	131-11-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dimethyl phthalate	131-11-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dimethyl phthalate	131-11-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0123	U
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0123	U
Dimethyl phthalate	131-11-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0117	U
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0123	U
Dimethyl phthalate	131-11-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0115	U
Dimethyl phthalate	131-11-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01235	UU
Dimethyl phthalate	131-11-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0115	U
Dimethyl phthalate	131-11-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0117	U
Dimethylphenol, 2,4-	105-67-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dimethylphenol, 2,4-	105-67-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dimethylphenol, 2,4-	105-67-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dimethylphenol, 2,4-	105-67-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dimethylphenol, 2,4-	105-67-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0101	U
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00989	U
Dimethylphenol, 2,4-	105-67-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01065	UU
Dimethylphenol, 2,4-	105-67-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00988	U
Dimethylphenol, 2,4-	105-67-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0101	U
Di-n-butyl phthalate	84-74-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Di-n-butyl phthalate	84-74-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Di-n-butyl phthalate	84-74-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Di-n-butyl phthalate	84-74-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Di-n-butyl phthalate	84-74-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00867	U
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00865	U
Di-n-butyl phthalate	84-74-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00823	U
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00866	U
Di-n-butyl phthalate	84-74-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00809	U
Di-n-butyl phthalate	84-74-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008745	UU
Di-n-butyl phthalate	84-74-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00809	U
Di-n-butyl phthalate	84-74-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00824	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0383	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0376	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0407	UU
Dinitro-2-methylphenol, 4,6-	534-52-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0376	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0383	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Dinitrobenzene, 1,3-	99-65-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Dinitrobenzene, 1,3-	99-65-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Dinitrobenzene, 1,3-	99-65-0	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Dinitrobenzene, 1,3-	99-65-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U

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Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dinitrobenzene, 1,3-	99-65-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Dinitrobenzene, 1,3-	99-65-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Dinitrobenzene, 1,3-	99-65-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Dinitrophenol, 2,4-	51-28-5	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9 U
Dinitrophenol, 2,4-	51-28-5	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87 U
Dinitrophenol, 2,4-	51-28-5	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1 U
Dinitrophenol, 2,4-	51-28-5	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89 U
Dinitrophenol, 2,4-	51-28-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0639 U
Dinitrophenol, 2,4-	51-28-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0638 U
Dinitrophenol, 2,4-	51-28-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0607 U
Dinitrophenol, 2,4-	51-28-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0638 U
Dinitrophenol, 2,4-	51-28-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0597 U
Dinitrophenol, 2,4-	51-28-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0645 UU
Dinitrophenol, 2,4-	51-28-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0596 U
Dinitrophenol, 2,4-	51-28-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0608 U
Dinitrotoluene, 2,4-	121-14-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dinitrotoluene, 2,4-	121-14-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dinitrotoluene, 2,4-	121-14-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dinitrotoluene, 2,4-	121-14-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dinitrotoluene, 2,4-	121-14-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0141 U
Dinitrotoluene, 2,4-	121-14-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0141 U
Dinitrotoluene, 2,4-	121-14-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0134 U
Dinitrotoluene, 2,4-	121-14-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0141 U
Dinitrotoluene, 2,4-	121-14-2	0.0375	mg/kg	0.374	J	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0131 J
Dinitrotoluene, 2,4-	121-14-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01425 UU
Dinitrotoluene, 2,4-	121-14-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0131 U
Dinitrotoluene, 2,4-	121-14-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0134 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,4- exp	121-14-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,4- exp	121-14-2	0.15	mg/kg	0.3	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,4- exp	121-14-2	0.176	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	J
Dinitrotoluene, 2,4- exp	121-14-2	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,4- exp	121-14-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Dinitrotoluene, 2,4- exp	121-14-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Dinitrotoluene, 2,4- exp	121-14-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Dinitrotoluene, 2,4- exp	121-14-2	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
Dinitrotoluene, 2,4- exp	121-14-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Dinitrotoluene, 2,4- exp	121-14-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Dinitrotoluene, 2,4- exp	121-14-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Dinitrotoluene, 2,4- exp	121-14-2	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Dinitrotoluene, 2,6-	606-20-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dinitrotoluene, 2,6-	606-20-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dinitrotoluene, 2,6-	606-20-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dinitrotoluene, 2,6-	606-20-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dinitrotoluene, 2,6-	606-20-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00963	U
Dinitrotoluene, 2,6-	606-20-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00961	U
Dinitrotoluene, 2,6-	606-20-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00914	U
Dinitrotoluene, 2,6-	606-20-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00962	U
Dinitrotoluene, 2,6-	606-20-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00899	U
Dinitrotoluene, 2,6-	606-20-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00972	UU
Dinitrotoluene, 2,6-	606-20-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00898	U
Dinitrotoluene, 2,6-	606-20-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00916	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,6- exp	606-20-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,6- exp	606-20-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,6- exp	606-20-2	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,6- exp	606-20-2	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,6- exp	606-20-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Dinitrotoluene, 2,6- exp	606-20-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Dinitrotoluene, 2,6- exp	606-20-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Dinitrotoluene, 2,6- exp	606-20-2	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Dinitrotoluene, 2,6- exp	606-20-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Dinitrotoluene, 2,6- exp	606-20-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Dinitrotoluene, 2,6- exp	606-20-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Dinitrotoluene, 2,6- exp	606-20-2	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Di-n-octyl phthalate	117-84-0	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Di-n-octyl phthalate	117-84-0	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Di-n-octyl phthalate	117-84-0	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Di-n-octyl phthalate	117-84-0	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Di-n-octyl phthalate	117-84-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0755	U
Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0754	U
Di-n-octyl phthalate	117-84-0	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0717	U
Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0754	U
Di-n-octyl phthalate	117-84-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0705	U
Di-n-octyl phthalate	117-84-0	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.07615	UU
Di-n-octyl phthalate	117-84-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0704	U
Di-n-octyl phthalate	117-84-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0718	U
DIPHENYLAMINE	122-39-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0397	U
DIPHENYLAMINE	122-39-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0397	U
DIPHENYLAMINE	122-39-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0377	U
DIPHENYLAMINE	122-39-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0397	U
DIPHENYLAMINE	122-39-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0371	U
DIPHENYLAMINE	122-39-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0401	UU
DIPHENYLAMINE	122-39-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0371	U
DIPHENYLAMINE	122-39-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0378	U
Ethylbenzene	100-41-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Ethylbenzene	100-41-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Ethylbenzene	100-41-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Fluoranthene	206-44-0	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Fluoranthene	206-44-0	1.2	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	
Fluoranthene	206-44-0	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Fluoranthene	206-44-0	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Fluoranthene	206-44-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00867	U
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00865	U
Fluoranthene	206-44-0	0.179	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00823	J
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00866	U
Fluoranthene	206-44-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00809	U
Fluoranthene	206-44-0	0.0903	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008745	JJ
Fluoranthene	206-44-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00809	U
Fluoranthene	206-44-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00824	U
Fluorene	86-73-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Fluorene	86-73-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Fluorene	86-73-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Fluorene	86-73-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Fluorene	86-73-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.017	U
Fluorene	86-73-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0169	U
Fluorene	86-73-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0161	U
Fluorene	86-73-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.017	U
Fluorene	86-73-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0158	U
Fluorene	86-73-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01715	UU
Fluorene	86-73-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0158	U
Fluorene	86-73-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0161	U
Hexachlorobenzene	118-74-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorobenzene	118-74-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachlorobenzene	118-74-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachlorobenzene	118-74-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorobenzene	118-74-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0249	U
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0249	U
Hexachlorobenzene	118-74-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0237	U
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0249	U
Hexachlorobenzene	118-74-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0233	U
Hexachlorobenzene	118-74-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0251	UU
Hexachlorobenzene	118-74-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0232	U
Hexachlorobenzene	118-74-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0237	U
Hexachlorobutadiene	87-68-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorobutadiene	87-68-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachlorobutadiene	87-68-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachlorobutadiene	87-68-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorobutadiene	87-68-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.038	U
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.038	U
Hexachlorobutadiene	87-68-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0361	U
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.038	U
Hexachlorobutadiene	87-68-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0355	U
Hexachlorobutadiene	87-68-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03835	UU
Hexachlorobutadiene	87-68-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0355	U
Hexachlorobutadiene	87-68-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0362	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Hexachlorocyclopentadiene	77-47-4	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorocyclopentadiene	77-47-4	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachlorocyclopentadiene	77-47-4	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachlorocyclopentadiene	77-47-4	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorocyclopentadiene	77-47-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0128	U
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0127	U
Hexachlorocyclopentadiene	77-47-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0121	U
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0127	U
Hexachlorocyclopentadiene	77-47-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0119	U
Hexachlorocyclopentadiene	77-47-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01285	UU
Hexachlorocyclopentadiene	77-47-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0119	U
Hexachlorocyclopentadiene	77-47-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0121	U
Hexachloroethane	67-72-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachloroethane	67-72-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachloroethane	67-72-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachloroethane	67-72-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachloroethane	67-72-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0123	U
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0123	U
Hexachloroethane	67-72-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0117	U
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0123	U
Hexachloroethane	67-72-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0115	U
Hexachloroethane	67-72-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01235	UU
Hexachloroethane	67-72-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0115	U
Hexachloroethane	67-72-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0117	U
Hexanone, 2-	591-78-6	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
Hexanone, 2-	591-78-6	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013	U
Hexanone, 2-	591-78-6	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	5	mg/kg	10	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	10	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
HMX	2691-41-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
HMX	2691-41-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
HMX	2691-41-0	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
HMX	2691-41-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
HMX	2691-41-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
HMX	2691-41-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
HMX	2691-41-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Indeno(1,2,3-cd)pyrene	193-39-5	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.13	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.13	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.295	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.123	J
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.13	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.121	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.271	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1315	JJ
Indeno(1,2,3-cd)pyrene	193-39-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.121	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.124	U
Iron	7439-89-6	10500	mg/kg	10.9		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	10.9	
Iron	7439-89-6	8110	mg/kg	13.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	13.3	
Iron	7439-89-6	10100	mg/kg	11.1		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	11.1	
Iron	7439-89-6	16400	mg/kg	13.4		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	13.4	
Iron	7439-89-6	12600	mg/kg	1.76	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.88	
Iron	7439-89-6	18300	mg/kg	1.69	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.843	
Iron	7439-89-6	12000	mg/kg	1.61	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.804	
Iron	7439-89-6	16400	mg/kg	1.88	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.938	
Iron	7439-89-6	28600	mg/kg	1.89	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.944	
Iron	7439-89-6	15350	mg/kg	1.93	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.9645	
Iron	7439-89-6	18200	mg/kg	1.68	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.842	
Iron	7439-89-6	12500	mg/kg	1.93	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.963	
Isophorone	78-59-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Isophorone	78-59-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Isophorone	78-59-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Isophorone	78-59-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Isophorone	78-59-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00482	U
Isophorone	78-59-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00481	U
Isophorone	78-59-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00457	U
Isophorone	78-59-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00481	U
Isophorone	78-59-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00449	U
Isophorone	78-59-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00486	UU
Isophorone	78-59-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00449	U
Isophorone	78-59-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00458	U
Lead	7439-92-1	56.9	mg/kg	0.34		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.34	
Lead	7439-92-1	19.8	mg/kg	0.33		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.33	
Lead	7439-92-1	12	mg/kg	0.4		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.4	
Lead	7439-92-1	25.4	mg/kg	0.33		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.33	
Lead	7439-92-1	107	mg/kg	0.33		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.33	
Lead	7439-92-1	28	mg/kg	0.33		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.33	
Lead	7439-92-1	115	mg/kg	0.36		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.36	
Lead	7439-92-1	96.05	mg/kg	0.365		PBOW99-SSW108	PBOW99SSW108P	METALS	REGFD	10-Jun-99	0.5	1	0.365	
Lead	7439-92-1	39.7	mg/kg	0.34		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.34	
Lead	7439-92-1	3.05	mg/kg	0.49		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245	
Lead	7439-92-1	4.24	mg/kg	0.422	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	
Lead	7439-92-1	13.2	mg/kg	0.402	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	
Lead	7439-92-1	5.04	mg/kg	0.484	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242	
Lead	7439-92-1	1.83	mg/kg	0.472	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	
Lead	7439-92-1	51.6	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	
Lead	7439-92-1	2.02	mg/kg	0.457		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229	
Lead	7439-92-1	7.11	mg/kg	0.482	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Magnesium	7439-95-4	1710	mg/kg	546		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546
Magnesium	7439-95-4	1180	mg/kg	663		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663
Magnesium	7439-95-4	2080	mg/kg	555		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555
Magnesium	7439-95-4	2380	mg/kg	670		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670
Magnesium	7439-95-4	4160	mg/kg	1.76		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.88
Magnesium	7439-95-4	830	mg/kg	1.69	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.843
Magnesium	7439-95-4	2320	mg/kg	1.61	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.804
Magnesium	7439-95-4	1140	mg/kg	1.88	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.938
Magnesium	7439-95-4	692	mg/kg	1.89	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.944
Magnesium	7439-95-4	965.5	mg/kg	1.93	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.9645
Magnesium	7439-95-4	792	mg/kg	1.68		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.842
Magnesium	7439-95-4	858	mg/kg	1.93	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.963
Manganese	7439-96-5	202	mg/kg	1.6		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.6
Manganese	7439-96-5	118	mg/kg	2		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	2
Manganese	7439-96-5	166	mg/kg	1.7		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.7
Manganese	7439-96-5	257	mg/kg	2		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	2
Manganese	7439-96-5	300	mg/kg	0.176	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088
Manganese	7439-96-5	157	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843
Manganese	7439-96-5	411	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804
Manganese	7439-96-5	122	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938
Manganese	7439-96-5	235	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944
Manganese	7439-96-5	104.5	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645
Manganese	7439-96-5	519	mg/kg	0.168	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842
Manganese	7439-96-5	150	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	1.3	mg/kg	0.11		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.11
Mercury	7439-97-6	0.065	mg/kg	0.13	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.13 U
Mercury	7439-97-6	0.15	mg/kg	0.11		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.11
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	0.16	mg/kg	0.12		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.12
Mercury	7439-97-6	0.27	mg/kg	0.12		PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	0.12
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	0.01145	mg/kg	0.0229	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.0115 U
Mercury	7439-97-6	0.0188	mg/kg	0.0225	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0113 J
Mercury	7439-97-6	0.0207	mg/kg	0.0211	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0105 J
Mercury	7439-97-6	0.0116	mg/kg	0.0232	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0116 U
Mercury	7439-97-6	0.0166	mg/kg	0.0226	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0113 J
Mercury	7439-97-6	0.06495	mg/kg	0.0222		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.0111
Mercury	7439-97-6	0.0201	mg/kg	0.0216	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0108 J
Mercury	7439-97-6	0.0146	mg/kg	0.0202	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0101 J
Methyl-2-pentanone, 4-	108-10-1	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U
Methyl-2-pentanone, 4-	108-10-1	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013 U
Methyl-2-pentanone, 4-	108-10-1	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U
Methylene chloride	75-09-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Methylene chloride	75-09-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Methylene chloride	75-09-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Methylnaphthalene, 2-	91-57-6	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylnaphthalene, 2-	91-57-6	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Methylnaphthalene, 2-	91-57-6	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Methylnaphthalene, 2-	91-57-6	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylnaphthalene, 2-	91-57-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.105 U
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.105 U
Methylnaphthalene, 2-	91-57-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0999 U
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.105 U
Methylnaphthalene, 2-	91-57-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0982 U
Methylnaphthalene, 2-	91-57-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1065 UU
Methylnaphthalene, 2-	91-57-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0981 U
Methylnaphthalene, 2-	91-57-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.1 U
Methylphenol, 2-	95-48-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 2-	95-48-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Methylphenol, 2-	95-48-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Methylphenol, 2-	95-48-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 2-	95-48-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00602 U
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00601 U
Methylphenol, 2-	95-48-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00572 U
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00601 U
Methylphenol, 2-	95-48-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00562 U
Methylphenol, 2-	95-48-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.006075 UU
Methylphenol, 2-	95-48-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00561 U
Methylphenol, 2-	95-48-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00572 U
Methylphenol, 4-	106-44-5	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 4-	106-44-5	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Methylphenol, 4-	106-44-5	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Methylphenol, 4-	106-44-5	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 4-	106-44-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0125 U
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0125 U
Methylphenol, 4-	106-44-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0119 U
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0125 U
Methylphenol, 4-	106-44-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0117 U
Methylphenol, 4-	106-44-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01265 UU
Methylphenol, 4-	106-44-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0117 U
Methylphenol, 4-	106-44-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0119 U
Naphthalene	91-20-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Naphthalene	91-20-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Naphthalene	91-20-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Naphthalene	91-20-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Naphthalene	91-20-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00951 U
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00949 U
Naphthalene	91-20-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00903 U
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0095 U
Naphthalene	91-20-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00888 U
Naphthalene	91-20-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0096 UU
Naphthalene	91-20-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00887 U
Naphthalene	91-20-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00904 U
Nickel	7440-02-0	7.3	mg/kg	4.4		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	4.4
Nickel	7440-02-0	6.1	mg/kg	5.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	5.3
Nickel	7440-02-0	6.5	mg/kg	4.4		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	4.4
Nickel	7440-02-0	9	mg/kg	5.4		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	5.4
Nickel	7440-02-0	0.132	mg/kg	0.264	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.132 U

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Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nickel	7440-02-0	0.1265	mg/kg	0.253	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.126	U
Nickel	7440-02-0	0.1205	mg/kg	0.241	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.121	U
Nickel	7440-02-0	0.1405	mg/kg	0.281	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.141	U
Nickel	7440-02-0	0.1415	mg/kg	0.283	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.142	U
Nickel	7440-02-0	0.14475	mg/kg	0.2895	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.1445	UU
Nickel	7440-02-0	0.126	mg/kg	0.252	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.126	U
Nickel	7440-02-0	0.1445	mg/kg	0.289	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.145	U
Nitroaniline, 2-	88-74-4	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Nitroaniline, 2-	88-74-4	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Nitroaniline, 2-	88-74-4	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Nitroaniline, 2-	88-74-4	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Nitroaniline, 2-	88-74-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0173	U
Nitroaniline, 2-	88-74-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0173	U
Nitroaniline, 2-	88-74-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0165	U
Nitroaniline, 2-	88-74-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0173	U
Nitroaniline, 2-	88-74-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0162	U
Nitroaniline, 2-	88-74-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0175	UU
Nitroaniline, 2-	88-74-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0162	U
Nitroaniline, 2-	88-74-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0165	U
Nitroaniline, 3-	99-09-2	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Nitroaniline, 3-	99-09-2	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Nitroaniline, 3-	99-09-2	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Nitroaniline, 3-	99-09-2	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Nitroaniline, 3-	99-09-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0136	U
Nitroaniline, 3-	99-09-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0136	U
Nitroaniline, 3-	99-09-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0129	U
Nitroaniline, 3-	99-09-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0136	U
Nitroaniline, 3-	99-09-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0127	U
Nitroaniline, 3-	99-09-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01375	UU
Nitroaniline, 3-	99-09-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0127	U
Nitroaniline, 3-	99-09-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0129	U
Nitroaniline, 4-	100-01-6	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Nitroaniline, 4-	100-01-6	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Nitroaniline, 4-	100-01-6	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Nitroaniline, 4-	100-01-6	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Nitroaniline, 4-	100-01-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.142	U
Nitroaniline, 4-	100-01-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.142	U
Nitroaniline, 4-	100-01-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.135	U
Nitroaniline, 4-	100-01-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.142	U
Nitroaniline, 4-	100-01-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.133	U
Nitroaniline, 4-	100-01-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1435	UU
Nitroaniline, 4-	100-01-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.133	U
Nitroaniline, 4-	100-01-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.135	U
Nitrobenzene	98-95-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Nitrobenzene	98-95-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Nitrobenzene	98-95-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Nitrobenzene	98-95-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Nitrobenzene	98-95-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0131	U
Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0131	U
Nitrobenzene	98-95-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0125	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0131	U
Nitrobenzene	98-95-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0122	U
Nitrobenzene	98-95-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01325	UU
Nitrobenzene	98-95-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0122	U
Nitrobenzene	98-95-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0125	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrobenzene - exp	98-95-3	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrobenzene - exp	98-95-3	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrobenzene - exp	98-95-3	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrobenzene - exp	98-95-3	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrobenzene - exp	98-95-3	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Nitrobenzene - exp	98-95-3	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Nitrobenzene - exp	98-95-3	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Nitrobenzene - exp	98-95-3	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Nitrobenzene - exp	98-95-3	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Nitrobenzene - exp	98-95-3	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Nitrobenzene - exp	98-95-3	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Nitrobenzene - exp	98-95-3	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Nitrophenol, 2-	88-75-5	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Nitrophenol, 2-	88-75-5	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Nitrophenol, 2-	88-75-5	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Nitrophenol, 2-	88-75-5	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Nitrophenol, 2-	88-75-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0142	U
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0142	U
Nitrophenol, 2-	88-75-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0135	U
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0142	U
Nitrophenol, 2-	88-75-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0133	U
Nitrophenol, 2-	88-75-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01435	UU
Nitrophenol, 2-	88-75-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0133	U
Nitrophenol, 2-	88-75-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0135	U
Nitrophenol, 4-	100-02-7	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Nitrophenol, 4-	100-02-7	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Nitrophenol, 4-	100-02-7	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Nitrophenol, 4-	100-02-7	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Nitrophenol, 4-	100-02-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0325	U
Nitrophenol, 4-	100-02-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0324	U
Nitrophenol, 4-	100-02-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0309	U
Nitrophenol, 4-	100-02-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0325	U
Nitrophenol, 4-	100-02-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0303	U
Nitrophenol, 4-	100-02-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0328	UU
Nitrophenol, 4-	100-02-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0303	U
Nitrophenol, 4-	100-02-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0309	U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 2-	88-72-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 2-	88-72-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 2-	88-72-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 2-	88-72-2	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 2-	88-72-2	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 2-	88-72-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Nitrotoluene, 2-	88-72-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Nitrotoluene, 2-	88-72-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Nitrotoluene, 2-	88-72-2	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
Nitrotoluene, 2-	88-72-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Nitrotoluene, 2-	88-72-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Nitrotoluene, 2-	88-72-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Nitrotoluene, 2-	88-72-2	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 3-	99-08-1	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 3-	99-08-1	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 3-	99-08-1	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 3-	99-08-1	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 3-	99-08-1	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Nitrotoluene, 3-	99-08-1	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Nitrotoluene, 3-	99-08-1	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Nitrotoluene, 3-	99-08-1	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
Nitrotoluene, 3-	99-08-1	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Nitrotoluene, 3-	99-08-1	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Nitrotoluene, 3-	99-08-1	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Nitrotoluene, 3-	99-08-1	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 4-	99-99-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 4-	99-99-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrotoluene, 4-	99-99-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 4-	99-99-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Nitrotoluene, 4-	99-99-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Nitrotoluene, 4-	99-99-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Nitrotoluene, 4-	99-99-0	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Nitrotoluene, 4-	99-99-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Nitrotoluene, 4-	99-99-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Nitrotoluene, 4-	99-99-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Nitrotoluene, 4-	99-99-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
n-Nitrosodimethylamine	62-75-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.012	U
n-Nitrosodimethylamine	62-75-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.012	U
n-Nitrosodimethylamine	62-75-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0114	U
n-Nitrosodimethylamine	62-75-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.012	U
n-Nitrosodimethylamine	62-75-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0112	U
n-Nitrosodimethylamine	62-75-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01215	UU
n-Nitrosodimethylamine	62-75-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0112	U
n-Nitrosodimethylamine	62-75-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0114	U
n-Nitroso-di-n-propylamine	621-64-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
n-Nitroso-di-n-propylamine	621-64-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
n-Nitroso-di-n-propylamine	621-64-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
n-Nitroso-di-n-propylamine	621-64-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
n-Nitroso-di-n-propylamine	621-64-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0143	U
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0143	U
n-Nitroso-di-n-propylamine	621-64-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0136	U
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0143	U
n-Nitroso-di-n-propylamine	621-64-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0134	U
n-Nitroso-di-n-propylamine	621-64-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01445	UU
n-Nitroso-di-n-propylamine	621-64-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0134	U
n-Nitroso-di-n-propylamine	621-64-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0136	U
n-Nitrosodiphenylamine	86-30-6	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
n-Nitrosodiphenylamine	86-30-6	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
n-Nitrosodiphenylamine	86-30-6	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
n-Nitrosodiphenylamine	86-30-6	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
n-Nitrosodiphenylamine	86-30-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00566	U
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00565	U
n-Nitrosodiphenylamine	86-30-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00537	U
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00565	U
n-Nitrosodiphenylamine	86-30-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00528	U
n-Nitrosodiphenylamine	86-30-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.005705	UU
n-Nitrosodiphenylamine	86-30-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00528	U
n-Nitrosodiphenylamine	86-30-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00538	U
Pentachlorophenol	87-86-5	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Pentachlorophenol	87-86-5	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Pentachlorophenol	87-86-5	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Pentachlorophenol	87-86-5	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Pentachlorophenol	87-86-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.036	U
Pentachlorophenol	87-86-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0359	U
Pentachlorophenol	87-86-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0342	U
Pentachlorophenol	87-86-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0359	U
Pentachlorophenol	87-86-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0336	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Pentachlorophenol	87-86-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03635 UU
Pentachlorophenol	87-86-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0336 U
Pentachlorophenol	87-86-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0342 U
Phenanthrene	85-01-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Phenanthrene	85-01-8	0.94	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Phenanthrene	85-01-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Phenanthrene	85-01-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Phenanthrene	85-01-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00975 U
Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00973 U
Phenanthrene	85-01-8	0.0579	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00926 J
Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00974 U
Phenanthrene	85-01-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0091 U
Phenanthrene	85-01-8	0.11925	mg/kg	0.4045	JU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00984 JU
Phenanthrene	85-01-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0091 U
Phenanthrene	85-01-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00927 U
Phenol	108-95-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Phenol	108-95-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Phenol	108-95-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Phenol	108-95-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Phenol	108-95-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00482 U
Phenol	108-95-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00481 U
Phenol	108-95-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00457 U
Phenol	108-95-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00481 U
Phenol	108-95-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00449 U
Phenol	108-95-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00486 UU
Phenol	108-95-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00449 U
Phenol	108-95-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00458 U
Potassium	7440-09-7	273	mg/kg	546	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546 U
Potassium	7440-09-7	331.5	mg/kg	663	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663 U
Potassium	7440-09-7	277.5	mg/kg	555	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555 U
Potassium	7440-09-7	335	mg/kg	670	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670 U
Potassium	7440-09-7	256	mg/kg	22		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	11
Potassium	7440-09-7	168	mg/kg	21.1		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	10.5
Potassium	7440-09-7	220	mg/kg	20.1		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	10
Potassium	7440-09-7	274	mg/kg	23.5		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	11.7
Potassium	7440-09-7	156	mg/kg	23.6		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	11.8
Potassium	7440-09-7	175.5	mg/kg	24.1		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	12.1
Potassium	7440-09-7	165	mg/kg	21		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	10.5
Potassium	7440-09-7	143	mg/kg	24.1		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	12
Pyrene	129-00-0	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Pyrene	129-00-0	0.86	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Pyrene	129-00-0	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Pyrene	129-00-0	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Pyrene	129-00-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.016 U
Pyrene	129-00-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.016 U
Pyrene	129-00-0	0.158	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0152 J
Pyrene	129-00-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.016 U
Pyrene	129-00-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0149 U
Pyrene	129-00-0	0.0731	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01615 JJ
Pyrene	129-00-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0149 U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Pyrene	129-00-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0152	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	5	mg/kg	10	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	10	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
RDX	121-82-4	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
RDX	121-82-4	0.239	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		
RDX	121-82-4	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
RDX	121-82-4	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
RDX	121-82-4	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
RDX	121-82-4	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
RDX	121-82-4	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
RDX	121-82-4	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
RDX	121-82-4	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
RDX	121-82-4	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
RDX	121-82-4	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
RDX	121-82-4	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Selenium	7782-49-2	0.76	mg/kg	0.56		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.56	
Selenium	7782-49-2	0.275	mg/kg	0.55	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55	U
Selenium	7782-49-2	0.33	mg/kg	0.66	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66	U
Selenium	7782-49-2	0.27	mg/kg	0.54	U	PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.54	U
Selenium	7782-49-2	0.28	mg/kg	0.56	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.56	U
Selenium	7782-49-2	0.275	mg/kg	0.55	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55	U
Selenium	7782-49-2	0.305	mg/kg	0.61	U	PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.61	U
Selenium	7782-49-2	0.6125	mg/kg	0.605	/U	PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	0.605	U
Selenium	7782-49-2	0.28	mg/kg	0.56	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.56	U
Selenium	7782-49-2	0.4895	mg/kg	0.979	UJ	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.49	U
Selenium	7782-49-2	0.4215	mg/kg	0.843	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.422	U
Selenium	7782-49-2	0.402	mg/kg	0.804	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.402	U
Selenium	7782-49-2	0.484	mg/kg	0.968	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.484	U
Selenium	7782-49-2	0.472	mg/kg	0.944	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.472	U
Selenium	7782-49-2	0.48225	mg/kg	0.9645	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.4825	UU
Selenium	7782-49-2	0.4575	mg/kg	0.915	UJ	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.457	U
Selenium	7782-49-2	0.4815	mg/kg	0.963	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.482	U
Silver	7440-22-4	0.28	mg/kg	0.56	U	PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.56	U
Silver	7440-22-4	0.275	mg/kg	0.55	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55	U
Silver	7440-22-4	0.33	mg/kg	0.66	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66	U
Silver	7440-22-4	0.27	mg/kg	0.54	U	PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.54	U
Silver	7440-22-4	0.28	mg/kg	0.56	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.56	U
Silver	7440-22-4	0.275	mg/kg	0.55	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55	U
Silver	7440-22-4	0.305	mg/kg	0.61	U	PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.61	U
Silver	7440-22-4	0.3025	mg/kg	0.605	UU	PBOW99-SSW108	PBOW99SSW108PI	METALS	REGFD	10-Jun-99	0.5	1	0.605	UU
Silver	7440-22-4	0.28	mg/kg	0.56	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.56	U
Silver	7440-22-4	0.22	mg/kg	0.44	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.22	U
Silver	7440-22-4	0.211	mg/kg	0.422	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	U
Silver	7440-22-4	0.201	mg/kg	0.402	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Silver	7440-22-4	0.2345	mg/kg	0.469	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.235	U
Silver	7440-22-4	0.236	mg/kg	0.472	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	U
Silver	7440-22-4	0.24125	mg/kg	0.4825	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	UU
Silver	7440-22-4	0.2105	mg/kg	0.421	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.21	U
Silver	7440-22-4	0.241	mg/kg	0.482	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	U
Sodium	7440-23-5	273	mg/kg	546	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546	U
Sodium	7440-23-5	331.5	mg/kg	663	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663	U
Sodium	7440-23-5	277.5	mg/kg	555	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555	U
Sodium	7440-23-5	335	mg/kg	670	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670	U
Sodium	7440-23-5	98.2	mg/kg	8.8		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	4.4	
Sodium	7440-23-5	51.6	mg/kg	8.43		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	4.22	
Sodium	7440-23-5	65.8	mg/kg	8.04		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	4.02	
Sodium	7440-23-5	50.1	mg/kg	9.38		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	4.69	
Sodium	7440-23-5	34.7	mg/kg	9.44		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	4.72	
Sodium	7440-23-5	57.5	mg/kg	9.645		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	4.825	
Sodium	7440-23-5	50.7	mg/kg	8.42		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	4.21	
Sodium	7440-23-5	33.3	mg/kg	9.63		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	4.82	
Styrene	100-42-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Styrene	100-42-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Styrene	100-42-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Tetrachloroethene	127-18-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Tetrachloroethene	127-18-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Tetrachloroethene	127-18-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	6.5	mg/kg	13	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	13	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65	U
Tetryl	479-45-8	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Tetryl	479-45-8	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Tetryl	479-45-8	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Tetryl	479-45-8	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Tetryl	479-45-8	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Tetryl	479-45-8	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Tetryl	479-45-8	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Tetryl	479-45-8	0.587	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	
Tetryl	479-45-8	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Tetryl	479-45-8	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Tetryl	479-45-8	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Tetryl	479-45-8	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Thallium	7440-28-0	0.55	mg/kg	1.1	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.1	U
Thallium	7440-28-0	0.65	mg/kg	1.3	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	1.3	U
Thallium	7440-28-0	0.55	mg/kg	1.1	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.1	U
Thallium	7440-28-0	0.65	mg/kg	1.3	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	1.3	U

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Thallium	7440-28-0	0.245	mg/kg	0.49	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245	U
Thallium	7440-28-0	0.211	mg/kg	0.422	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	U
Thallium	7440-28-0	0.201	mg/kg	0.402	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	U
Thallium	7440-28-0	0.242	mg/kg	0.484	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242	U
Thallium	7440-28-0	0.236	mg/kg	0.472	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	U
Thallium	7440-28-0	0.24125	mg/kg	0.4825	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	UU
Thallium	7440-28-0	0.2285	mg/kg	0.457	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229	U
Thallium	7440-28-0	0.241	mg/kg	0.482	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	U
Toluene	108-88-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Toluene	108-88-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Toluene	108-88-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichlorobenzene, 1,2,4-	120-82-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorobenzene, 1,2,4-	120-82-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Trichlorobenzene, 1,2,4-	120-82-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Trichlorobenzene, 1,2,4-	120-82-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorobenzene, 1,2,4-	120-82-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00987	U
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00986	U
Trichlorobenzene, 1,2,4-	120-82-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00937	U
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00986	U
Trichlorobenzene, 1,2,4-	120-82-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00921	U
Trichlorobenzene, 1,2,4-	120-82-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00996	UU
Trichlorobenzene, 1,2,4-	120-82-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00921	U
Trichlorobenzene, 1,2,4-	120-82-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00939	U
Trichloroethane, 1,1,1-	71-55-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichloroethane, 1,1,1-	71-55-6	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Trichloroethane, 1,1,1-	71-55-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichloroethane, 1,1,2-	79-00-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichloroethane, 1,1,2-	79-00-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Trichloroethane, 1,1,2-	79-00-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichloroethene	79-01-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichloroethene	79-01-6	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Trichloroethene	79-01-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Trichlorophenol, 2,4,5-	95-95-4	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorophenol, 2,4,5-	95-95-4	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Trichlorophenol, 2,4,5-	95-95-4	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Trichlorophenol, 2,4,5-	95-95-4	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorophenol, 2,4,5-	95-95-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0344	U
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0344	U
Trichlorophenol, 2,4,5-	95-95-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0327	U
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0344	U
Trichlorophenol, 2,4,5-	95-95-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0321	U
Trichlorophenol, 2,4,5-	95-95-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03475	UU
Trichlorophenol, 2,4,5-	95-95-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0321	U
Trichlorophenol, 2,4,5-	95-95-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0327	U
Trichlorophenol, 2,4,6-	88-06-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorophenol, 2,4,6-	88-06-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Trichlorophenol, 2,4,6-	88-06-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Trichlorophenol, 2,4,6-	88-06-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorophenol, 2,4,6-	88-06-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0271	U
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.027	U

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trichlorophenol, 2,4,6-	88-06-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0257	U
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.027	U
Trichlorophenol, 2,4,6-	88-06-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0253	U
Trichlorophenol, 2,4,6-	88-06-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0273	UU
Trichlorophenol, 2,4,6-	88-06-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0253	U
Trichlorophenol, 2,4,6-	88-06-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0258	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Trinitrobenzene, 1,3,5-	99-35-4	0.461	mg/kg		J	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		
Trinitrobenzene, 1,3,5-	99-35-4	0.159	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		J
Trinitrobenzene, 1,3,5-	99-35-4	0.116	mg/kg		J	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		J
Trinitrobenzene, 1,3,5-	99-35-4	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Trinitrobenzene, 1,3,5-	99-35-4	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Trinitrobenzene, 1,3,5-	99-35-4	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Trinitrobenzene, 1,3,5-	99-35-4	0.836	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	
Trinitrobenzene, 1,3,5-	99-35-4	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Trinitrobenzene, 1,3,5-	99-35-4	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Trinitrobenzene, 1,3,5-	99-35-4	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Trinitrobenzene, 1,3,5-	99-35-4	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrotoluene, 2,4,6-	118-96-7	0.66	mg/kg	0.25		PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	
Trinitrotoluene, 2,4,6-	118-96-7	130	mg/kg	5		PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrotoluene, 2,4,6-	118-96-7	1.4	mg/kg	0.25		PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	
Trinitrotoluene, 2,4,6-	118-96-7	2.74	mg/kg		J	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		
Trinitrotoluene, 2,4,6-	118-96-7	49.9	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		
Trinitrotoluene, 2,4,6-	118-96-7	0.352	mg/kg			PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		
Trinitrotoluene, 2,4,6-	118-96-7	6.24	mg/kg			PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		
Trinitrotoluene, 2,4,6-	118-96-7	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Trinitrotoluene, 2,4,6-	118-96-7	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Trinitrotoluene, 2,4,6-	118-96-7	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Trinitrotoluene, 2,4,6-	118-96-7	26.9	mg/kg	3.17		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	1.59	
Trinitrotoluene, 2,4,6-	118-96-7	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Trinitrotoluene, 2,4,6-	118-96-7	0.1525	mg/kg	0.2845	JU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	JU
Trinitrotoluene, 2,4,6-	118-96-7	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Trinitrotoluene, 2,4,6-	118-96-7	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Vanadium	7440-62-2	14.6	mg/kg	5.5		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	5.5	
Vanadium	7440-62-2	12.6	mg/kg	6.6		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	6.6	
Vanadium	7440-62-2	13.8	mg/kg	5.5		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	5.5	
Vanadium	7440-62-2	26.5	mg/kg	6.7		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	6.7	

Table E-1
Surface Soil Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Vanadium	7440-62-2	24.5	mg/kg	0.176		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088	
Vanadium	7440-62-2	40.5	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843	
Vanadium	7440-62-2	22	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804	
Vanadium	7440-62-2	31.5	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938	
Vanadium	7440-62-2	56.7	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944	
Vanadium	7440-62-2	26.5	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645	
Vanadium	7440-62-2	36.4	mg/kg	0.168		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842	
Vanadium	7440-62-2	26.7	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963	
Vinyl chloride	75-01-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Vinyl chloride	75-01-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Vinyl chloride	75-01-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Xylenes, total	1330-20-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Xylenes, total	1330-20-7	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Xylenes, total	1330-20-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Zinc	7440-66-6	59.4	mg/kg	2.2		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	2.2	MBD
Zinc	7440-66-6	25.5	mg/kg	2.7		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	2.7	MBD
Zinc	7440-66-6	31.4	mg/kg	2.2		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	2.2	MBD
Zinc	7440-66-6	50.7	mg/kg	2.7		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	2.7	MBD
Zinc	7440-66-6	23.9	mg/kg	2.2		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	1.1	
Zinc	7440-66-6	30.4	mg/kg	2.11		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	1.05	
Zinc	7440-66-6	25.1	mg/kg	2.01		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	1	
Zinc	7440-66-6	27.1	mg/kg	2.35		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	1.17	
Zinc	7440-66-6	30.8	mg/kg	2.36		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	1.18	
Zinc	7440-66-6	40.25	mg/kg	2.41		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	1.21	
Zinc	7440-66-6	25	mg/kg	2.1		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	1.05	
Zinc	7440-66-6	38.8	mg/kg	2.41		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	1.2	

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

PARAMETER	CASNUM	RES	UNIT	DETLIMIT	VQUAL	LOCATION_CODE	SAMPLE_NO	USER_TEST_PANEL	PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METH_DET_LIM	LAB_QUAL
Acenaphthene	83-32-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthene	83-32-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Acenaphthene	83-32-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Acenaphthene	83-32-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthene	83-32-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00722	U
Acenaphthene	83-32-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00722	U
Acenaphthene	83-32-9	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00672	U
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00721	U
Acenaphthene	83-32-9	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00719	UU
Acenaphthene	83-32-9	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00711	U
Acenaphthene	83-32-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00686	U
Acenaphthene	83-32-9	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00714	U
Acenaphthene	83-32-9	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00698	U
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00721	U
Acenaphthene	83-32-9	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00727	U
Acenaphthene	83-32-9	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00701	U
Acenaphthene	83-32-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00674	U
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00721	U
Acenaphthene	83-32-9	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00715	U
Acenaphthene	83-32-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00729	UU
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00721	U
Acenaphthene	83-32-9	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00704	U
Acenaphthene	83-32-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00674	U
Acenaphthene	83-32-9	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00728	U
Acenaphthene	83-32-9	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00683	U
Acenaphthene	83-32-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00687	U
Acenaphthene	83-32-9	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00707	U
Acenaphthene	83-32-9	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00671	UU
Acenaphthylene	208-96-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthylene	208-96-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Acenaphthylene	208-96-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Acenaphthylene	208-96-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Acenaphthylene	208-96-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00482	U
Acenaphthylene	208-96-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00481	U
Acenaphthylene	208-96-8	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00448	U
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00481	U
Acenaphthylene	208-96-8	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.004795	UU
Acenaphthylene	208-96-8	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00474	U
Acenaphthylene	208-96-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00457	U
Acenaphthylene	208-96-8	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00476	U
Acenaphthylene	208-96-8	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00466	U
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00481	U
Acenaphthylene	208-96-8	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00485	U
Acenaphthylene	208-96-8	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00467	U
Acenaphthylene	208-96-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00449	U
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00481	U
Acenaphthylene	208-96-8	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00476	U
Acenaphthylene	208-96-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00486	UU
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00481	U
Acenaphthylene	208-96-8	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00469	U
Acenaphthylene	208-96-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00449	U
Acenaphthylene	208-96-8	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00485	U
Acenaphthylene	208-96-8	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00455	U
Acenaphthylene	208-96-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00458	U
Acenaphthylene	208-96-8	0.0467	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00471	J
Acenaphthylene	208-96-8	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00447	UU
Acetone	67-64-1	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Acetone	67-64-1	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013 U
Acetone	67-64-1	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U
Aluminum	7429-90-5	4340	mg/kg	21.8		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	21.8
Aluminum	7429-90-5	5560	mg/kg	26.5		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	26.5
Aluminum	7429-90-5	4960	mg/kg	22.2		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	22.2
Aluminum	7429-90-5	8020	mg/kg	26.8		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	26.8
Aluminum	7429-90-5	2840	mg/kg	1.76		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.88
Aluminum	7429-90-5	8210	mg/kg	1.62		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.81
Aluminum	7429-90-5	9740	mg/kg	1.68		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.842
Aluminum	7429-90-5	6820	mg/kg	1.69		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.843
Aluminum	7429-90-5	5870	mg/kg	1.735		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.867
Aluminum	7429-90-5	8770	mg/kg	1.9		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.951
Aluminum	7429-90-5	3400	mg/kg	1.61		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.804
Aluminum	7429-90-5	10300	mg/kg	1.84		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.921
Aluminum	7429-90-5	10900	mg/kg	1.85		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.924
Aluminum	7429-90-5	4610	mg/kg	1.88		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.938
Aluminum	7429-90-5	2210	mg/kg	1.84		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.921
Aluminum	7429-90-5	13100	mg/kg	1.78		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.888
Aluminum	7429-90-5	5310	mg/kg	1.89		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.944
Aluminum	7429-90-5	2300	mg/kg	1.87		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.934
Aluminum	7429-90-5	15000	mg/kg	1.89		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.947
Aluminum	7429-90-5	5980	mg/kg	1.93		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.9645
Aluminum	7429-90-5	2370	mg/kg	1.94		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.971
Aluminum	7429-90-5	12400	mg/kg	1.87		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.935
Aluminum	7429-90-5	4850	mg/kg	1.68		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.842
Aluminum	7429-90-5	2380	mg/kg	2.1		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	1.05
Aluminum	7429-90-5	9450	mg/kg	1.66		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.83
Aluminum	7429-90-5	6230	mg/kg	1.93		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.963
Aluminum	7429-90-5	4220	mg/kg	1.81		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.906
Aluminum	7429-90-5	6775	mg/kg	1.63		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.814
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.33	mg/kg	0.25		PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.66	mg/kg	0.25		PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.375	mg/kg	0.75	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	8.06	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.154	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	J
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.17	mg/kg		J	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.458	mg/kg	0.296		WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.31	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	2.95	mg/kg	0.306		WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.168	mg/kg	0.29	J	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 J
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.197	mg/kg	0.317	J	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 J
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.176	mg/kg	0.2885	JU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 JU
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.29	mg/kg	0.25		PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25
Amino-4,6-dinitrotoluene, 2-	35572-78-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.74	mg/kg	0.25		PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25
Amino-4,6-dinitrotoluene, 2-	35572-78-2	1.84	mg/kg			PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	6.02	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.0932	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	J
Amino-4,6-dinitrotoluene, 2-	35572-78-2	1.46	mg/kg			PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.193	mg/kg	0.2805	JU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 JU
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	1.05	mg/kg	0.296		WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	3.09	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159
Amino-4,6-dinitrotoluene, 2-	35572-78-2	7.51	mg/kg	1.12		WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.561
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	7.74	mg/kg	1.53		WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.765
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.499	mg/kg	0.29		WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.185	mg/kg	0.294	J	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 J
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.6235	mg/kg	0.2885		WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445
Anthracene	120-12-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Anthracene	120-12-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Anthracene	120-12-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Anthracene	120-12-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Anthracene	120-12-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00867 U
Anthracene	120-12-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00866 U
Anthracene	120-12-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00807 U
Anthracene	120-12-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00865 U
Anthracene	120-12-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.008625 UU
Anthracene	120-12-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00853 U
Anthracene	120-12-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00823 U
Anthracene	120-12-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00857 U
Anthracene	120-12-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00838 U
Anthracene	120-12-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00866 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Anthracene	120-12-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00873 U
Anthracene	120-12-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00841 U
Anthracene	120-12-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00809 U
Anthracene	120-12-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00866 U
Anthracene	120-12-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00858 U
Anthracene	120-12-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008745 UU
Anthracene	120-12-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00866 U
Anthracene	120-12-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00845 U
Anthracene	120-12-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00809 U
Anthracene	120-12-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00873 U
Anthracene	120-12-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0082 U
Anthracene	120-12-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00824 U
Anthracene	120-12-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00848 U
Anthracene	120-12-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00805 UU
Antimony	7440-36-0	0.55	mg/kg	1.1	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.1 U
Antimony	7440-36-0	0.65	mg/kg	1.3	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	1.3 U
Antimony	7440-36-0	0.55	mg/kg	1.1	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.1 U
Antimony	7440-36-0	3.9	mg/kg	1.3		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	1.3
Antimony	7440-36-0	0.245	mg/kg	0.49	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245 U
Antimony	7440-36-0	0.225	mg/kg	0.45	U	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.225 U
Antimony	7440-36-0	0.229	mg/kg	0.458	U	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.229 U
Antimony	7440-36-0	0.211	mg/kg	0.422	UJ	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211 U
Antimony	7440-36-0	0.21675	mg/kg	0.4335	UJUJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165 UU
Antimony	7440-36-0	0.2395	mg/kg	0.479	U	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.24 U
Antimony	7440-36-0	0.421	mg/kg	0.402	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201
Antimony	7440-36-0	0.23	mg/kg	0.46	UJ	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23 U
Antimony	7440-36-0	0.205	mg/kg	0.41	U	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.205 U
Antimony	7440-36-0	0.299	mg/kg	0.484	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242 J
Antimony	7440-36-0	0.2305	mg/kg	0.461	UJ	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23 U
Antimony	7440-36-0	0.238	mg/kg	0.476	U	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.238 U
Antimony	7440-36-0	0.236	mg/kg	0.472	UJ	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236 U
Antimony	7440-36-0	0.2335	mg/kg	0.467	UJ	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234 U
Antimony	7440-36-0	0.233	mg/kg	0.466	U	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.233 U
Antimony	7440-36-0	1.2835	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241
Antimony	7440-36-0	0.488	mg/kg	0.486	J	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243
Antimony	7440-36-0	0.225	mg/kg	0.45	U	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.225 U
Antimony	7440-36-0	0.2285	mg/kg	0.457	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229 U
Antimony	7440-36-0	0.234	mg/kg	0.468	U	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.234 U
Antimony	7440-36-0	0.2005	mg/kg	0.401	U	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.2 U
Antimony	7440-36-0	0.241	mg/kg	0.482	UJ	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241 U
Antimony	7440-36-0	0.2265	mg/kg	0.453	UJ	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227 U
Antimony	7440-36-0	0.21175	mg/kg	0.4235	UU	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.212 UU
Aroclor 1016	12674-11-2	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036 U
Aroclor 1016	12674-11-2	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044 U
Aroclor 1016	12674-11-2	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037 U
Aroclor 1016	12674-11-2	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806 U
Aroclor 1016	12674-11-2	0.02005	mg/kg	0.0401	U	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803 U
Aroclor 1016	12674-11-2	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794 U
Aroclor 1016	12674-11-2	0.08005	mg/kg	0.04005	JJ	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802 PP
Aroclor 1016	12674-11-2	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778 U
Aroclor 1016	12674-11-2	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802 U
Aroclor 1016	12674-11-2	0.02	mg/kg	0.04	UJ	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802 U
Aroclor 1016	12674-11-2	0.0198	mg/kg	0.0396	U	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793 U
Aroclor 1016	12674-11-2	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757 U
Aroclor 1016	12674-11-2	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802 U
Aroclor 1016	12674-11-2	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085 UU
Aroclor 1016	12674-11-2	0.0198	mg/kg	0.0396	U	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794 U
Aroclor 1016	12674-11-2	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Aroclor 1016	12674-11-2	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U
Aroclor 1016	12674-11-2	0.0294	mg/kg	0.0376	J	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	P,J
Aroclor 1016	12674-11-2	0.131	mg/kg	0.039	J	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078	P
Aroclor 1221	11104-28-2	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1221	11104-28-2	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1221	11104-28-2	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1221	11104-28-2	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1221	11104-28-2	0.02005	mg/kg	0.0401	U	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803	U
Aroclor 1221	11104-28-2	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1221	11104-28-2	0.02003	mg/kg	0.04005	UU	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802	UU
Aroclor 1221	11104-28-2	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1221	11104-28-2	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802	U
Aroclor 1221	11104-28-2	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1221	11104-28-2	0.0198	mg/kg	0.0396	U	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793	U
Aroclor 1221	11104-28-2	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1221	11104-28-2	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802	U
Aroclor 1221	11104-28-2	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1221	11104-28-2	0.0198	mg/kg	0.0396	U	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794	U
Aroclor 1221	11104-28-2	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1221	11104-28-2	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U
Aroclor 1221	11104-28-2	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1221	11104-28-2	0.0195	mg/kg	0.039	U	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078	U
Aroclor 1232	11141-16-5	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1232	11141-16-5	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1232	11141-16-5	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1232	11141-16-5	0.0328	mg/kg	0.0402	J	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806	P,J
Aroclor 1232	11141-16-5	0.02005	mg/kg	0.0401	U	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803	U
Aroclor 1232	11141-16-5	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1232	11141-16-5	0.02003	mg/kg	0.04005	UU	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802	UU
Aroclor 1232	11141-16-5	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1232	11141-16-5	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802	U
Aroclor 1232	11141-16-5	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1232	11141-16-5	0.0198	mg/kg	0.0396	U	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793	U
Aroclor 1232	11141-16-5	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1232	11141-16-5	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802	U
Aroclor 1232	11141-16-5	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1232	11141-16-5	0.0198	mg/kg	0.0396	U	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794	U
Aroclor 1232	11141-16-5	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1232	11141-16-5	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U
Aroclor 1232	11141-16-5	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1232	11141-16-5	0.0195	mg/kg	0.039	U	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078	U
Aroclor 1242	53469-21-9	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1242	53469-21-9	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1242	53469-21-9	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1242	53469-21-9	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1242	53469-21-9	0.0432	mg/kg	0.0401	J	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803	P
Aroclor 1242	53469-21-9	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1242	53469-21-9	0.02003	mg/kg	0.04005	UU	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802	UU
Aroclor 1242	53469-21-9	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1242	53469-21-9	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802	U
Aroclor 1242	53469-21-9	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1242	53469-21-9	0.0198	mg/kg	0.0396	U	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793	U
Aroclor 1242	53469-21-9	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1242	53469-21-9	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802	U
Aroclor 1242	53469-21-9	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1242	53469-21-9	0.0198	mg/kg	0.0396	U	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794	U
Aroclor 1242	53469-21-9	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1242	53469-21-9	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Aroclor 1242	53469-21-9	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1242	53469-21-9	0.0195	mg/kg	0.039	U	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078	U
Aroclor 1248	12672-29-6	0.018	mg/kg	0.036	U	PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036	U
Aroclor 1248	12672-29-6	0.022	mg/kg	0.044	U	PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044	U
Aroclor 1248	12672-29-6	0.0185	mg/kg	0.037	U	PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037	U
Aroclor 1248	12672-29-6	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1248	12672-29-6	0.02005	mg/kg	0.0401	U	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803	U
Aroclor 1248	12672-29-6	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1248	12672-29-6	0.02003	mg/kg	0.04005	UU	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802	UU
Aroclor 1248	12672-29-6	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1248	12672-29-6	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802	U
Aroclor 1248	12672-29-6	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1248	12672-29-6	0.0198	mg/kg	0.0396	U	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793	U
Aroclor 1248	12672-29-6	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1248	12672-29-6	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802	U
Aroclor 1248	12672-29-6	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1248	12672-29-6	0.0198	mg/kg	0.0396	U	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794	U
Aroclor 1248	12672-29-6	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1248	12672-29-6	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U
Aroclor 1248	12672-29-6	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1248	12672-29-6	0.0195	mg/kg	0.039	U	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078	U
Aroclor 1254	11097-69-1	0.18	mg/kg	0.036		PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036	
Aroclor 1254	11097-69-1	0.085	mg/kg	0.044		PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044	
Aroclor 1254	11097-69-1	0.074	mg/kg	0.037		PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037	
Aroclor 1254	11097-69-1	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1254	11097-69-1	0.02005	mg/kg	0.0401	U	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803	U
Aroclor 1254	11097-69-1	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1254	11097-69-1	0.02003	mg/kg	0.04005	UU	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802	UU
Aroclor 1254	11097-69-1	0.0194	mg/kg	0.0388	U	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778	U
Aroclor 1254	11097-69-1	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802	U
Aroclor 1254	11097-69-1	0.02	mg/kg	0.04	U	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1254	11097-69-1	0.0198	mg/kg	0.0396	U	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793	U
Aroclor 1254	11097-69-1	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1254	11097-69-1	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802	U
Aroclor 1254	11097-69-1	0.0202	mg/kg	0.0404	UU	WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	UU
Aroclor 1254	11097-69-1	0.0198	mg/kg	0.0396	U	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794	U
Aroclor 1254	11097-69-1	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1254	11097-69-1	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U
Aroclor 1254	11097-69-1	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	U
Aroclor 1254	11097-69-1	0.0195	mg/kg	0.039	U	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078	U
Aroclor 1260	11096-82-5	0.11	mg/kg	0.036		PBOW99-SSW102	PBOW99SSW102	PEST/PCB	REG	10-Jun-99	0.5	1	0.036	
Aroclor 1260	11096-82-5	0.05	mg/kg	0.044		PBOW99-SSW103	PBOW99SSW103	PEST/PCB	REG	10-Jun-99	0.5	1	0.044	
Aroclor 1260	11096-82-5	0.047	mg/kg	0.037		PBOW99-SSW106	PBOW99SSW106	PEST/PCB	REG	10-Jun-99	0.5	1	0.037	
Aroclor 1260	11096-82-5	0.0201	mg/kg	0.0402	U	WWTP1-SB01	WW0001	PEST/PCB	REG	5-Dec-08	2.6	3.6	0.00806	U
Aroclor 1260	11096-82-5	0.02005	mg/kg	0.0401	U	WWTP1-SB01	WW0002	PEST/PCB	REG	5-Dec-08	5.6	7.6	0.00803	U
Aroclor 1260	11096-82-5	0.0198	mg/kg	0.0396	U	WWTP1-SB02	WW0004	PEST/PCB	REG	4-Dec-08	1.6	2.6	0.00794	U
Aroclor 1260	11096-82-5	0.02003	mg/kg	0.04005	UU	WWTP1-SB02	WW0005WW0006	PEST/PCB	REGFD	4-Dec-08	5	6.6	0.00802	UU
Aroclor 1260	11096-82-5	0.041	mg/kg	0.0388	J	WWTP1-SB03	WW0008	PEST/PCB	REG	4-Dec-08	1.2	2.2	0.00778	P
Aroclor 1260	11096-82-5	0.02	mg/kg	0.04	U	WWTP1-SB03	WW0009	PEST/PCB	REG	4-Dec-08	5	6.2	0.00802	U
Aroclor 1260	11096-82-5	0.02	mg/kg	0.04	UJ	WWTP1-SB04	WW0011	PEST/PCB	REG	4-Dec-08	1.7	2.7	0.00802	U
Aroclor 1260	11096-82-5	0.0197	mg/kg	0.0396	J	WWTP1-SB04	WW0012	PEST/PCB	REG	4-Dec-08	5	6.7	0.00793	P,J
Aroclor 1260	11096-82-5	0.0189	mg/kg	0.0378	U	WWTP1-SB05	WW0014	PEST/PCB	REG	4-Dec-08	2.2	3.2	0.00757	U
Aroclor 1260	11096-82-5	0.02	mg/kg	0.04	U	WWTP1-SB05	WW0015	PEST/PCB	REG	4-Dec-08	5.2	7.2	0.00802	P,U
Aroclor 1260	11096-82-5	0.1235	mg/kg	0.0404		WWTP1-SB06	WW0018WW0017	PEST/PCB	FDREG	3-Dec-08	1.1	2.1	0.008085	
Aroclor 1260	11096-82-5	0.0126	mg/kg	0.0396	J	WWTP1-SB06	WW0019	PEST/PCB	REG	3-Dec-08	5	6.1	0.00794	P,J
Aroclor 1260	11096-82-5	0.01875	mg/kg	0.0375	U	WWTP1-SB07	WW0021	PEST/PCB	REG	3-Dec-08	1	2	0.00751	U
Aroclor 1260	11096-82-5	0.0202	mg/kg	0.0404	U	WWTP1-SB07	WW0022	PEST/PCB	REG	3-Dec-08	5	6	0.00809	U
Aroclor 1260	11096-82-5	0.0188	mg/kg	0.0376	U	WWTP1-SB08	WW0024	PEST/PCB	REG	4-Dec-08	1.8	2.8	0.00754	U

Aroclor 1260	11096-82-5	0.0195	mg/kg	0.039	U	WWTP1-SB08	WW0025	PEST/PCB	REG	4-Dec-08	5	6.8	0.0078 U
Arsenic	7440-38-2	3.2	mg/kg	1.1		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	1.1
Arsenic	7440-38-2	4.2	mg/kg	1.1		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.1
Arsenic	7440-38-2	3	mg/kg	1.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	1.3
Arsenic	7440-38-2	4	mg/kg	1.1		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	1.1
Arsenic	7440-38-2	4.1	mg/kg	1.1		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	1.1
Arsenic	7440-38-2	3.2	mg/kg	1.1		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.1
Arsenic	7440-38-2	4.5	mg/kg	1.2		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	1.2
Arsenic	7440-38-2	4.35	mg/kg	1.2		PBOW99-SSW108	PBOW99SSW108PBOW99SSW	METALS	REGFD	10-Jun-99	0.5	1	1.2
Arsenic	7440-38-2	3.8	mg/kg	1.1		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	1.1
Arsenic	7440-38-2	2.43	mg/kg	0.979		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.49
Arsenic	7440-38-2	5.29	mg/kg	0.901		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.45
Arsenic	7440-38-2	8.95	mg/kg	0.917		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.458
Arsenic	7440-38-2	2.55	mg/kg	0.843		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.422
Arsenic	7440-38-2	1.53	mg/kg	0.867		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.4335
Arsenic	7440-38-2	6	mg/kg	0.959		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.479
Arsenic	7440-38-2	2.15	mg/kg	0.804		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.402
Arsenic	7440-38-2	5.54	mg/kg	0.921		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.46
Arsenic	7440-38-2	4.71	mg/kg	0.82		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.41
Arsenic	7440-38-2	2.96	mg/kg	0.968		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.484
Arsenic	7440-38-2	1.14	mg/kg	0.921		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.461
Arsenic	7440-38-2	5.34	mg/kg	0.953		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.476
Arsenic	7440-38-2	1.78	mg/kg	0.944		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.472
Arsenic	7440-38-2	1.99	mg/kg	0.934		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.467
Arsenic	7440-38-2	2.86	mg/kg	0.933		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.466
Arsenic	7440-38-2	2.275	mg/kg	0.9645		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.4825
Arsenic	7440-38-2	1.41	mg/kg	0.971		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.486
Arsenic	7440-38-2	5.6	mg/kg	0.9		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.45
Arsenic	7440-38-2	0.998	mg/kg	0.915		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.457
Arsenic	7440-38-2	1.82	mg/kg	0.936		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.468
Arsenic	7440-38-2	10.8	mg/kg	0.801		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.401
Arsenic	7440-38-2	2.02	mg/kg	0.963		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.482
Arsenic	7440-38-2	1.61	mg/kg	0.906		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.453
Arsenic	7440-38-2	8.685	mg/kg	0.8475		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.4235
Barium	7440-39-3	25	mg/kg	22.6		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	22.6
Barium	7440-39-3	27.1	mg/kg	21.8		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	21.8
Barium	7440-39-3	13.25	mg/kg	26.5	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	26.5 U
Barium	7440-39-3	23.1	mg/kg	21.7		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	21.7
Barium	7440-39-3	29.9	mg/kg	22.3		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	22.3
Barium	7440-39-3	24.6	mg/kg	22.2		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	22.2
Barium	7440-39-3	31.9	mg/kg	24.2		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	24.2
Barium	7440-39-3	35.75	mg/kg	24.25		PBOW99-SSW108	PBOW99SSW10899SSW110	METALS	REGFD	10-Jun-99	0.5	1	24.25
Barium	7440-39-3	28.2	mg/kg	22.6		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	22.6
Barium	7440-39-3	14.2	mg/kg	0.176		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088
Barium	7440-39-3	56.9	mg/kg	0.162		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.081
Barium	7440-39-3	31.6	mg/kg	0.168		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.0842
Barium	7440-39-3	17.2	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843
Barium	7440-39-3	34.15	mg/kg	0.1735		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.0867
Barium	7440-39-3	51.3	mg/kg	0.19		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.0951
Barium	7440-39-3	20.7	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804
Barium	7440-39-3	58.1	mg/kg	0.184		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.0921
Barium	7440-39-3	64.5	mg/kg	0.185		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.0924
Barium	7440-39-3	14.4	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938
Barium	7440-39-3	9.57	mg/kg	0.184		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.0921
Barium	7440-39-3	79.1	mg/kg	0.178		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.0888
Barium	7440-39-3	13.9	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944
Barium	7440-39-3	7.93	mg/kg	0.187		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.0934
Barium	7440-39-3	112	mg/kg	0.189		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.0947

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Barium	7440-39-3	17.15	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645	
Barium	7440-39-3	7.69	mg/kg	0.194		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.0971	
Barium	7440-39-3	77.3	mg/kg	0.187		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.0935	
Barium	7440-39-3	15	mg/kg	0.168		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842	
Barium	7440-39-3	9.98	mg/kg	0.21		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.105	
Barium	7440-39-3	45.4	mg/kg	0.166		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.083	
Barium	7440-39-3	19.7	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963	
Barium	7440-39-3	9.68	mg/kg	0.181		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.0906	
Barium	7440-39-3	32.8	mg/kg	0.163		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.0814	
Benzene	71-43-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Benzene	71-43-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Benzene	71-43-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Benzo(a)anthracene	56-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(a)anthracene	56-55-3	0.51	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	
Benzo(a)anthracene	56-55-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Benzo(a)anthracene	56-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(a)anthracene	56-55-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0264	U
Benzo(a)anthracene	56-55-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0264	U
Benzo(a)anthracene	56-55-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0245	U
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0263	U
Benzo(a)anthracene	56-55-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.02625	UU
Benzo(a)anthracene	56-55-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0259	U
Benzo(a)anthracene	56-55-3	0.122	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.025	J
Benzo(a)anthracene	56-55-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0261	U
Benzo(a)anthracene	56-55-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0255	U
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0263	U
Benzo(a)anthracene	56-55-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0265	U
Benzo(a)anthracene	56-55-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0256	U
Benzo(a)anthracene	56-55-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0246	U
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0263	U
Benzo(a)anthracene	56-55-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0261	U
Benzo(a)anthracene	56-55-3	0.04435	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0266	JJ
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0263	U
Benzo(a)anthracene	56-55-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0257	U
Benzo(a)anthracene	56-55-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0246	U
Benzo(a)anthracene	56-55-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0266	U
Benzo(a)anthracene	56-55-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0249	U
Benzo(a)anthracene	56-55-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0251	U
Benzo(a)anthracene	56-55-3	0.169	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0258	J
Benzo(a)anthracene	56-55-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0245	UU
Benzo(a)pyrene	50-32-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(a)pyrene	50-32-8	0.42	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	
Benzo(a)pyrene	50-32-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Benzo(a)pyrene	50-32-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Benzo(a)pyrene	50-32-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0264	U
Benzo(a)pyrene	50-32-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0264	U
Benzo(a)pyrene	50-32-8	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0245	U
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0263	U
Benzo(a)pyrene	50-32-8	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.02625	UU
Benzo(a)pyrene	50-32-8	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0259	U
Benzo(a)pyrene	50-32-8	0.115	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.025	J
Benzo(a)pyrene	50-32-8	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0261	U
Benzo(a)pyrene	50-32-8	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0255	U
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0263	U
Benzo(a)pyrene	50-32-8	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0265	U
Benzo(a)pyrene	50-32-8	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0256	U
Benzo(a)pyrene	50-32-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0246	U
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0263	U

Benzo(a)pyrene	50-32-8	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0261 U
Benzo(a)pyrene	50-32-8	0.1209	mg/kg	0.4045	JU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0266 JU
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0263 U
Benzo(a)pyrene	50-32-8	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0257 U
Benzo(a)pyrene	50-32-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0246 U
Benzo(a)pyrene	50-32-8	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0266 U
Benzo(a)pyrene	50-32-8	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0249 U
Benzo(a)pyrene	50-32-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0251 U
Benzo(a)pyrene	50-32-8	0.19	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0258 J
Benzo(a)pyrene	50-32-8	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0245 UU
Benzo(b)fluoranthene	205-99-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(b)fluoranthene	205-99-2	0.55	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Benzo(b)fluoranthene	205-99-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Benzo(b)fluoranthene	205-99-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(b)fluoranthene	205-99-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0668 U
Benzo(b)fluoranthene	205-99-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0668 U
Benzo(b)fluoranthene	205-99-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0622 U
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0667 U
Benzo(b)fluoranthene	205-99-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0665 UU
Benzo(b)fluoranthene	205-99-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0657 U
Benzo(b)fluoranthene	205-99-2	0.182	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0634 J
Benzo(b)fluoranthene	205-99-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0661 U
Benzo(b)fluoranthene	205-99-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0646 U
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0667 U
Benzo(b)fluoranthene	205-99-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0673 U
Benzo(b)fluoranthene	205-99-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0648 U
Benzo(b)fluoranthene	205-99-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0624 U
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0667 U
Benzo(b)fluoranthene	205-99-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0661 U
Benzo(b)fluoranthene	205-99-2	0.13715	mg/kg	0.4045	JU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0674 JU
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0667 U
Benzo(b)fluoranthene	205-99-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0651 U
Benzo(b)fluoranthene	205-99-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0623 U
Benzo(b)fluoranthene	205-99-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0673 U
Benzo(b)fluoranthene	205-99-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0632 U
Benzo(b)fluoranthene	205-99-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0635 U
Benzo(b)fluoranthene	205-99-2	0.279	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0654 J
Benzo(b)fluoranthene	205-99-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.06205 UU
Benzo(ghi)perylene	191-24-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(ghi)perylene	191-24-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Benzo(ghi)perylene	191-24-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Benzo(ghi)perylene	191-24-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(ghi)perylene	191-24-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0977 U
Benzo(ghi)perylene	191-24-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0977 U
Benzo(ghi)perylene	191-24-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.091 U
Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0976 U
Benzo(ghi)perylene	191-24-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0973 UU
Benzo(ghi)perylene	191-24-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0962 U
Benzo(ghi)perylene	191-24-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0928 U
Benzo(ghi)perylene	191-24-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0967 U
Benzo(ghi)perylene	191-24-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0945 U
Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0976 U
Benzo(ghi)perylene	191-24-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0984 U
Benzo(ghi)perylene	191-24-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0948 U
Benzo(ghi)perylene	191-24-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0912 U
Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0976 U
Benzo(ghi)perylene	191-24-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0967 U
Benzo(ghi)perylene	191-24-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0986 UU

Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0976 U
Benzo(ghi)perylene	191-24-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0953 U
Benzo(ghi)perylene	191-24-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0912 U
Benzo(ghi)perylene	191-24-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0985 U
Benzo(ghi)perylene	191-24-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0924 U
Benzo(ghi)perylene	191-24-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0929 U
Benzo(ghi)perylene	191-24-2	0.105	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0956 J
Benzo(ghi)perylene	191-24-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0908 UU
Benzo(k)fluoranthene	207-08-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(k)fluoranthene	207-08-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Benzo(k)fluoranthene	207-08-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Benzo(k)fluoranthene	207-08-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Benzo(k)fluoranthene	207-08-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.122 U
Benzo(k)fluoranthene	207-08-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.122 U
Benzo(k)fluoranthene	207-08-9	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.113 U
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.121 U
Benzo(k)fluoranthene	207-08-9	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.1215 UU
Benzo(k)fluoranthene	207-08-9	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.12 U
Benzo(k)fluoranthene	207-08-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.115 U
Benzo(k)fluoranthene	207-08-9	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.12 U
Benzo(k)fluoranthene	207-08-9	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.118 U
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.121 U
Benzo(k)fluoranthene	207-08-9	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.122 U
Benzo(k)fluoranthene	207-08-9	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.118 U
Benzo(k)fluoranthene	207-08-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.113 U
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.121 U
Benzo(k)fluoranthene	207-08-9	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.12 U
Benzo(k)fluoranthene	207-08-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1225 UU
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.121 U
Benzo(k)fluoranthene	207-08-9	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.119 U
Benzo(k)fluoranthene	207-08-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.113 U
Benzo(k)fluoranthene	207-08-9	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.123 U
Benzo(k)fluoranthene	207-08-9	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.115 U
Benzo(k)fluoranthene	207-08-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.116 U
Benzo(k)fluoranthene	207-08-9	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.119 U
Benzo(k)fluoranthene	207-08-9	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.113 UU
Benzoic acid	65-85-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0977 U
Benzoic acid	65-85-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0977 U
Benzoic acid	65-85-0	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.091 U
Benzoic acid	65-85-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0976 U
Benzoic acid	65-85-0	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0973 UU
Benzoic acid	65-85-0	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0962 U
Benzoic acid	65-85-0	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0928 U
Benzoic acid	65-85-0	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0967 U
Benzoic acid	65-85-0	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0945 U
Benzoic acid	65-85-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0976 U
Benzoic acid	65-85-0	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0984 U
Benzoic acid	65-85-0	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0948 U
Benzoic acid	65-85-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0912 U
Benzoic acid	65-85-0	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0976 U
Benzoic acid	65-85-0	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0967 U
Benzoic acid	65-85-0	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0986 UU
Benzoic acid	65-85-0	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0976 U
Benzoic acid	65-85-0	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0953 U
Benzoic acid	65-85-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0912 U
Benzoic acid	65-85-0	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0985 U
Benzoic acid	65-85-0	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0924 U
Benzoic acid	65-85-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0929 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Benzoic acid	65-85-0	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0956	U
Benzoic acid	65-85-0	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0908	UU
Benzyl alcohol	100-51-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0977	U
Benzyl alcohol	100-51-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0977	U
Benzyl alcohol	100-51-6	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.091	U
Benzyl alcohol	100-51-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0976	U
Benzyl alcohol	100-51-6	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0973	UU
Benzyl alcohol	100-51-6	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0962	U
Benzyl alcohol	100-51-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0928	U
Benzyl alcohol	100-51-6	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0967	U
Benzyl alcohol	100-51-6	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0945	U
Benzyl alcohol	100-51-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0976	U
Benzyl alcohol	100-51-6	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0984	U
Benzyl alcohol	100-51-6	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0948	U
Benzyl alcohol	100-51-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0912	U
Benzyl alcohol	100-51-6	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0976	U
Benzyl alcohol	100-51-6	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0967	U
Benzyl alcohol	100-51-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0986	UU
Benzyl alcohol	100-51-6	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0976	U
Benzyl alcohol	100-51-6	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0953	U
Benzyl alcohol	100-51-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0912	U
Benzyl alcohol	100-51-6	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0985	U
Benzyl alcohol	100-51-6	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0924	U
Benzyl alcohol	100-51-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0929	U
Benzyl alcohol	100-51-6	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0956	U
Benzyl alcohol	100-51-6	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0908	UU
Beryllium	7440-41-7	0.275	mg/kg	0.55	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55	U
Beryllium	7440-41-7	0.33	mg/kg	0.66	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66	U
Beryllium	7440-41-7	0.275	mg/kg	0.55	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55	U
Beryllium	7440-41-7	0.335	mg/kg	0.67	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	0.67	U
Beryllium	7440-41-7	4.48	mg/kg	0.176	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088	
Beryllium	7440-41-7	5.31	mg/kg	0.162	J	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.081	
Beryllium	7440-41-7	7.75	mg/kg	0.168	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.0842	
Beryllium	7440-41-7	6.36	mg/kg	0.169	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843	
Beryllium	7440-41-7	4.675	mg/kg	0.1735	JJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.0867	
Beryllium	7440-41-7	6.01	mg/kg	0.19	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.0951	
Beryllium	7440-41-7	4.21	mg/kg	0.161	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804	
Beryllium	7440-41-7	6.57	mg/kg	0.184	J	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.0921	
Beryllium	7440-41-7	7.07	mg/kg	0.185	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.0924	
Beryllium	7440-41-7	5.67	mg/kg	0.188	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938	
Beryllium	7440-41-7	3.23	mg/kg	0.184	J	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.0921	
Beryllium	7440-41-7	8.23	mg/kg	0.178	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.0888	
Beryllium	7440-41-7	8.44	mg/kg	0.189	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944	
Beryllium	7440-41-7	2.14	mg/kg	0.187	J	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.0934	
Beryllium	7440-41-7	8.89	mg/kg	0.189	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.0947	
Beryllium	7440-41-7	5.49	mg/kg	0.193	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645	
Beryllium	7440-41-7	3.37	mg/kg	0.194	J	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.0971	
Beryllium	7440-41-7	7.55	mg/kg	0.187	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.0935	
Beryllium	7440-41-7	6.3	mg/kg	0.168	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842	
Beryllium	7440-41-7	2.29	mg/kg	0.21	J	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.105	
Beryllium	7440-41-7	7.24	mg/kg	0.166	J	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.083	
Beryllium	7440-41-7	4.73	mg/kg	0.193	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963	
Beryllium	7440-41-7	4.86	mg/kg	0.181	J	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.0906	
Beryllium	7440-41-7	5.905	mg/kg	0.163	JJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.0814	
Bis(2-chloroethoxy)methane	111-91-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethoxy)methane	111-91-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-chloroethoxy)methane	111-91-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-chloroethoxy)methane	111-91-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Bis(2-chloroethoxy)methane	111-91-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00843	U
Bis(2-chloroethoxy)methane	111-91-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00842	U
Bis(2-chloroethoxy)methane	111-91-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00784	U
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00841	U
Bis(2-chloroethoxy)methane	111-91-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00839	UU
Bis(2-chloroethoxy)methane	111-91-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00829	U
Bis(2-chloroethoxy)methane	111-91-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.008	U
Bis(2-chloroethoxy)methane	111-91-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00833	U
Bis(2-chloroethoxy)methane	111-91-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00815	U
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00842	U
Bis(2-chloroethoxy)methane	111-91-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00848	U
Bis(2-chloroethoxy)methane	111-91-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00817	U
Bis(2-chloroethoxy)methane	111-91-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00787	U
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00842	U
Bis(2-chloroethoxy)methane	111-91-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00834	U
Bis(2-chloroethoxy)methane	111-91-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008505	UU
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00842	U
Bis(2-chloroethoxy)methane	111-91-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00821	U
Bis(2-chloroethoxy)methane	111-91-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00786	U
Bis(2-chloroethoxy)methane	111-91-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00849	U
Bis(2-chloroethoxy)methane	111-91-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00797	U
Bis(2-chloroethoxy)methane	111-91-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00801	U
Bis(2-chloroethoxy)methane	111-91-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00824	U
Bis(2-chloroethoxy)methane	111-91-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.007825	UU
Bis(2-chloroethyl)ether	111-44-4	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethyl)ether	111-44-4	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-chloroethyl)ether	111-44-4	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-chloroethyl)ether	111-44-4	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroethyl)ether	111-44-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00952	U
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0102	UU
Bis(2-chloroethyl)ether	111-44-4	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0101	U
Bis(2-chloroethyl)ether	111-44-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00972	U
Bis(2-chloroethyl)ether	111-44-4	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0101	U
Bis(2-chloroethyl)ether	111-44-4	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0099	U
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0103	U
Bis(2-chloroethyl)ether	111-44-4	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00993	U
Bis(2-chloroethyl)ether	111-44-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00955	U
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0101	U
Bis(2-chloroethyl)ether	111-44-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01035	UU
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0102	U
Bis(2-chloroethyl)ether	111-44-4	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00998	U
Bis(2-chloroethyl)ether	111-44-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00954	U
Bis(2-chloroethyl)ether	111-44-4	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0103	U
Bis(2-chloroethyl)ether	111-44-4	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00968	U
Bis(2-chloroethyl)ether	111-44-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00973	U
Bis(2-chloroethyl)ether	111-44-4	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.01	U
Bis(2-chloroethyl)ether	111-44-4	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.009505	UU
Bis(2-chloroisopropyl)ether	108-60-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroisopropyl)ether	108-60-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Bis(2-chloroisopropyl)ether	108-60-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Bis(2-chloroisopropyl)ether	108-60-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Bis(2-chloroisopropyl)ether	108-60-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0175	U
Bis(2-chloroisopropyl)ether	108-60-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0174	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Bis(2-chloroisopropyl)ether	108-60-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0162 U
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0174 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0174 UU
Bis(2-chloroisopropyl)ether	108-60-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0172 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0166 U
Bis(2-chloroisopropyl)ether	108-60-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0173 U
Bis(2-chloroisopropyl)ether	108-60-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0169 U
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0174 U
Bis(2-chloroisopropyl)ether	108-60-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0176 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0169 U
Bis(2-chloroisopropyl)ether	108-60-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0163 U
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0174 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0173 U
Bis(2-chloroisopropyl)ether	108-60-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0176 UU
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0174 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.017 U
Bis(2-chloroisopropyl)ether	108-60-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0163 U
Bis(2-chloroisopropyl)ether	108-60-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0176 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0165 U
Bis(2-chloroisopropyl)ether	108-60-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0166 U
Bis(2-chloroisopropyl)ether	108-60-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0171 U
Bis(2-chloroisopropyl)ether	108-60-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.01625 UU
Bis(2-ethylhexyl)phthalate	117-81-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0371 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0371 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0345 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.037 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03695 UU
Bis(2-ethylhexyl)phthalate	117-81-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0365 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0352 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0367 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0359 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.037 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0373 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.036 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0346 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.037 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.0568	mg/kg	0.397	J	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0367 J
Bis(2-ethylhexyl)phthalate	117-81-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03745 UU
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.037 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0361 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0346 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0374 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0351 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0353 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0363 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0344 UU
Bromodichloromethane	75-27-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Bromodichloromethane	75-27-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Bromodichloromethane	75-27-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Bromoform	75-25-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Bromoform	75-25-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Bromoform	75-25-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Bromomethane	74-83-9	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Bromomethane	74-83-9	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Bromomethane	74-83-9	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Bromophenyl phenyl ether, 4-	101-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Bromophenyl phenyl ether, 4-	101-55-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Bromophenyl phenyl ether, 4-	101-55-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Bromophenyl phenyl ether, 4-	101-55-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Bromophenyl phenyl ether, 4-	101-55-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0143 U
Bromophenyl phenyl ether, 4-	101-55-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0143 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0133 U
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0143 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01425 UU
Bromophenyl phenyl ether, 4-	101-55-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0141 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0136 U
Bromophenyl phenyl ether, 4-	101-55-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0142 U
Bromophenyl phenyl ether, 4-	101-55-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139 U
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0143 U
Bromophenyl phenyl ether, 4-	101-55-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0144 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139 U
Bromophenyl phenyl ether, 4-	101-55-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0134 U
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0143 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0142 U
Bromophenyl phenyl ether, 4-	101-55-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01445 UU
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0143 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.014 U
Bromophenyl phenyl ether, 4-	101-55-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0134 U
Bromophenyl phenyl ether, 4-	101-55-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0144 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0135 U
Bromophenyl phenyl ether, 4-	101-55-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0136 U
Bromophenyl phenyl ether, 4-	101-55-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.014 U
Bromophenyl phenyl ether, 4-	101-55-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0133 UU
Butanone, 2-	78-93-3	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U
Butanone, 2-	78-93-3	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013 U
Butanone, 2-	78-93-3	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U
Butyl benzyl phthalate	85-68-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Butyl benzyl phthalate	85-68-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Butyl benzyl phthalate	85-68-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Butyl benzyl phthalate	85-68-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Butyl benzyl phthalate	85-68-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0163 U
Butyl benzyl phthalate	85-68-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0162 U
Butyl benzyl phthalate	85-68-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0151 U
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0162 U
Butyl benzyl phthalate	85-68-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0162 UU
Butyl benzyl phthalate	85-68-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.016 U
Butyl benzyl phthalate	85-68-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0154 U
Butyl benzyl phthalate	85-68-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0161 U
Butyl benzyl phthalate	85-68-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0157 U
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0162 U
Butyl benzyl phthalate	85-68-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0164 U
Butyl benzyl phthalate	85-68-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0158 U
Butyl benzyl phthalate	85-68-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0152 U
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0162 U
Butyl benzyl phthalate	85-68-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0161 U
Butyl benzyl phthalate	85-68-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0164 UU
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0162 U
Butyl benzyl phthalate	85-68-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0158 U
Butyl benzyl phthalate	85-68-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0152 U
Butyl benzyl phthalate	85-68-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0164 U
Butyl benzyl phthalate	85-68-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0154 U
Butyl benzyl phthalate	85-68-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0155 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Butyl benzyl phthalate	85-68-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0159	U
Butyl benzyl phthalate	85-68-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0151	UU
Cadmium	7440-43-9	0.115	mg/kg	0.23	U	PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.23	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.135	mg/kg	0.27	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.27	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.11	mg/kg	0.22	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.22	U
Cadmium	7440-43-9	0.12	mg/kg	0.24	U	PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.24	U
Cadmium	7440-43-9	0.1225	mg/kg	0.245	UU	PBOW99-SSW108	PBOW99SSW108PBOW99SSW	METALS	REGFD	10-Jun-99	0.5	1	0.245	UU
Cadmium	7440-43-9	0.115	mg/kg	0.23	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.23	U
Cadmium	7440-43-9	0.245	mg/kg	0.49	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245	U
Cadmium	7440-43-9	0.225	mg/kg	0.45	U	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.225	U
Cadmium	7440-43-9	0.229	mg/kg	0.458	U	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.229	U
Cadmium	7440-43-9	0.211	mg/kg	0.422	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	U
Cadmium	7440-43-9	0.21675	mg/kg	0.4335	UU	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165	UU
Cadmium	7440-43-9	0.296	mg/kg	0.479	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.24	J
Cadmium	7440-43-9	0.201	mg/kg	0.402	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	U
Cadmium	7440-43-9	0.23	mg/kg	0.46	U	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23	U
Cadmium	7440-43-9	0.205	mg/kg	0.41	U	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.205	U
Cadmium	7440-43-9	0.242	mg/kg	0.484	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242	U
Cadmium	7440-43-9	0.2305	mg/kg	0.461	U	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23	U
Cadmium	7440-43-9	0.238	mg/kg	0.476	U	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.238	U
Cadmium	7440-43-9	0.236	mg/kg	0.472	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	U
Cadmium	7440-43-9	0.2335	mg/kg	0.467	U	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234	U
Cadmium	7440-43-9	0.233	mg/kg	0.466	U	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.233	U
Cadmium	7440-43-9	0.508	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	J
Cadmium	7440-43-9	0.243	mg/kg	0.486	U	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243	U
Cadmium	7440-43-9	0.272	mg/kg	0.45	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.225	J
Cadmium	7440-43-9	0.2285	mg/kg	0.457	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229	U
Cadmium	7440-43-9	0.234	mg/kg	0.468	U	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.234	U
Cadmium	7440-43-9	0.2005	mg/kg	0.401	U	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.2	U
Cadmium	7440-43-9	0.241	mg/kg	0.482	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	U
Cadmium	7440-43-9	0.2265	mg/kg	0.453	U	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227	U
Cadmium	7440-43-9	0.21175	mg/kg	0.4235	UU	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.212	UU
Calcium	7440-70-2	9030	mg/kg	546		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546	
Calcium	7440-70-2	3380	mg/kg	663		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663	
Calcium	7440-70-2	7770	mg/kg	555		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555	
Calcium	7440-70-2	20100	mg/kg	670		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670	
Calcium	7440-70-2	15200	mg/kg	4.4	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	2.2	
Calcium	7440-70-2	47200	mg/kg	4.05		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	2.03	
Calcium	7440-70-2	34500	mg/kg	4.21	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	2.1	
Calcium	7440-70-2	1810	mg/kg	4.22		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	2.11	
Calcium	7440-70-2	39900	mg/kg	4.335		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	2.165	
Calcium	7440-70-2	50300	mg/kg	4.76	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	2.38	
Calcium	7440-70-2	8260	mg/kg	4.02		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	2.01	
Calcium	7440-70-2	38000	mg/kg	4.6		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	2.3	
Calcium	7440-70-2	44700	mg/kg	4.62	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	2.31	
Calcium	7440-70-2	3880	mg/kg	4.69		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	2.35	
Calcium	7440-70-2	25800	mg/kg	4.61		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	2.3	
Calcium	7440-70-2	36400	mg/kg	4.44	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	2.22	
Calcium	7440-70-2	1790	mg/kg	4.72		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	2.36	
Calcium	7440-70-2	37000	mg/kg	4.67		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	2.34	
Calcium	7440-70-2	34000	mg/kg	4.74	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	2.37	
Calcium	7440-70-2	2345	mg/kg	4.825		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	2.41	
Calcium	7440-70-2	32300	mg/kg	4.86		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	2.43	
Calcium	7440-70-2	46100	mg/kg	4.68	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	2.34	
Calcium	7440-70-2	1910	mg/kg	4.21	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	2.1	

Calcium	7440-70-2	48400	mg/kg	5.25	J	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	2.62
Calcium	7440-70-2	43200	mg/kg	4.15	J	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	2.07
Calcium	7440-70-2	1830	mg/kg	4.82		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	2.41
Calcium	7440-70-2	9000	mg/kg	4.53		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	2.27
Calcium	7440-70-2	44750	mg/kg	4.07	JJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	2.04
Carbazole	86-74-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Carbazole	86-74-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Carbazole	86-74-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Carbazole	86-74-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Carbazole	86-74-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0401 U
Carbazole	86-74-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0401 U
Carbazole	86-74-8	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0373 U
Carbazole	86-74-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.04 U
Carbazole	86-74-8	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0399 UU
Carbazole	86-74-8	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0394 U
Carbazole	86-74-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0381 U
Carbazole	86-74-8	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0396 U
Carbazole	86-74-8	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0388 U
Carbazole	86-74-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.04 U
Carbazole	86-74-8	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0404 U
Carbazole	86-74-8	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0389 U
Carbazole	86-74-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0374 U
Carbazole	86-74-8	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.04 U
Carbazole	86-74-8	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0397 U
Carbazole	86-74-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.04045 UU
Carbazole	86-74-8	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.04 U
Carbazole	86-74-8	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0391 U
Carbazole	86-74-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0374 U
Carbazole	86-74-8	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0404 U
Carbazole	86-74-8	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0379 U
Carbazole	86-74-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0381 U
Carbazole	86-74-8	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0392 U
Carbazole	86-74-8	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.03725 UU
Carbon disulfide	75-15-0	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Carbon disulfide	75-15-0	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Carbon disulfide	75-15-0	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Carbon tetrachloride	56-23-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Carbon tetrachloride	56-23-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Carbon tetrachloride	56-23-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloro-3-methylphenol, 4-	59-50-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloro-3-methylphenol, 4-	59-50-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chloro-3-methylphenol, 4-	59-50-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chloro-3-methylphenol, 4-	59-50-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloro-3-methylphenol, 4-	59-50-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00987 U
Chloro-3-methylphenol, 4-	59-50-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00987 U
Chloro-3-methylphenol, 4-	59-50-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00919 U
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00986 U
Chloro-3-methylphenol, 4-	59-50-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00983 UU
Chloro-3-methylphenol, 4-	59-50-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00971 U
Chloro-3-methylphenol, 4-	59-50-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00937 U
Chloro-3-methylphenol, 4-	59-50-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00976 U
Chloro-3-methylphenol, 4-	59-50-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00955 U
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00986 U
Chloro-3-methylphenol, 4-	59-50-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00994 U
Chloro-3-methylphenol, 4-	59-50-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00958 U
Chloro-3-methylphenol, 4-	59-50-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00921 U
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00986 U
Chloro-3-methylphenol, 4-	59-50-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00977 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Chloro-3-methylphenol, 4-	59-50-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00996 UU
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00986 U
Chloro-3-methylphenol, 4-	59-50-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00962 U
Chloro-3-methylphenol, 4-	59-50-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00921 U
Chloro-3-methylphenol, 4-	59-50-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00995 U
Chloro-3-methylphenol, 4-	59-50-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00934 U
Chloro-3-methylphenol, 4-	59-50-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00939 U
Chloro-3-methylphenol, 4-	59-50-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00966 U
Chloro-3-methylphenol, 4-	59-50-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.009165 UU
Chloroaniline, 4-	106-47-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloroaniline, 4-	106-47-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chloroaniline, 4-	106-47-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chloroaniline, 4-	106-47-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloroaniline, 4-	106-47-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0348 U
Chloroaniline, 4-	106-47-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0348 U
Chloroaniline, 4-	106-47-8	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0324 U
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0347 U
Chloroaniline, 4-	106-47-8	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03465 UU
Chloroaniline, 4-	106-47-8	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0342 U
Chloroaniline, 4-	106-47-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.033 U
Chloroaniline, 4-	106-47-8	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0344 U
Chloroaniline, 4-	106-47-8	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0336 U
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0347 U
Chloroaniline, 4-	106-47-8	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.035 U
Chloroaniline, 4-	106-47-8	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0337 U
Chloroaniline, 4-	106-47-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0325 U
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0348 U
Chloroaniline, 4-	106-47-8	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0344 U
Chloroaniline, 4-	106-47-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03515 UU
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0347 U
Chloroaniline, 4-	106-47-8	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0339 U
Chloroaniline, 4-	106-47-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0325 U
Chloroaniline, 4-	106-47-8	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0351 U
Chloroaniline, 4-	106-47-8	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0329 U
Chloroaniline, 4-	106-47-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0331 U
Chloroaniline, 4-	106-47-8	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.034 U
Chloroaniline, 4-	106-47-8	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0323 UU
Chlorobenzene	108-90-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chlorobenzene	108-90-7	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chlorobenzene	108-90-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroethane	75-00-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroethane	75-00-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chloroethane	75-00-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroform	67-66-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloroform	67-66-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chloroform	67-66-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloromethane	74-87-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloromethane	74-87-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Chloromethane	74-87-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Chloronaphthalene, 2-	91-58-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloronaphthalene, 2-	91-58-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chloronaphthalene, 2-	91-58-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chloronaphthalene, 2-	91-58-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chloronaphthalene, 2-	91-58-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00638 U
Chloronaphthalene, 2-	91-58-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00638 U
Chloronaphthalene, 2-	91-58-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00594 U
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00637 U
Chloronaphthalene, 2-	91-58-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00635 UU

Chloronaphthalene, 2-	91-58-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00628 U
Chloronaphthalene, 2-	91-58-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00606 U
Chloronaphthalene, 2-	91-58-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00631 U
Chloronaphthalene, 2-	91-58-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00617 U
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00637 U
Chloronaphthalene, 2-	91-58-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00642 U
Chloronaphthalene, 2-	91-58-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00619 U
Chloronaphthalene, 2-	91-58-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00596 U
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00637 U
Chloronaphthalene, 2-	91-58-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00631 U
Chloronaphthalene, 2-	91-58-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.006435 UU
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00637 U
Chloronaphthalene, 2-	91-58-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00622 U
Chloronaphthalene, 2-	91-58-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00595 U
Chloronaphthalene, 2-	91-58-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00643 U
Chloronaphthalene, 2-	91-58-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00603 U
Chloronaphthalene, 2-	91-58-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00607 U
Chloronaphthalene, 2-	91-58-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00624 U
Chloronaphthalene, 2-	91-58-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.005925 UU
Chlorophenol, 2-	95-57-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenol, 2-	95-57-8	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chlorophenol, 2-	95-57-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chlorophenol, 2-	95-57-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenol, 2-	95-57-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00494 U
Chlorophenol, 2-	95-57-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00493 U
Chlorophenol, 2-	95-57-8	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00459 U
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00493 U
Chlorophenol, 2-	95-57-8	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00491 UU
Chlorophenol, 2-	95-57-8	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00486 U
Chlorophenol, 2-	95-57-8	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00469 U
Chlorophenol, 2-	95-57-8	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00488 U
Chlorophenol, 2-	95-57-8	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00477 U
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00493 U
Chlorophenol, 2-	95-57-8	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00497 U
Chlorophenol, 2-	95-57-8	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00479 U
Chlorophenol, 2-	95-57-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00461 U
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00493 U
Chlorophenol, 2-	95-57-8	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00488 U
Chlorophenol, 2-	95-57-8	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00498 UU
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00493 U
Chlorophenol, 2-	95-57-8	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00481 U
Chlorophenol, 2-	95-57-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0046 U
Chlorophenol, 2-	95-57-8	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00497 U
Chlorophenol, 2-	95-57-8	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00467 U
Chlorophenol, 2-	95-57-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00469 U
Chlorophenol, 2-	95-57-8	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00483 U
Chlorophenol, 2-	95-57-8	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00458 UU
Chlorophenyl phenyl ether, 4-	7005-72-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0307 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0307 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0286 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0306 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03055 UU
Chlorophenyl phenyl ether, 4-	7005-72-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0302 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0291 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Chlorophenyl phenyl ether, 4-	7005-72-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0304	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0297	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0307	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0309	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0298	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0287	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0307	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0304	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03095	UU
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0307	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0299	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0286	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0309	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.029	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0292	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.03	U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.02855	UU
Chromium	7440-47-3	9.9	mg/kg	0.56		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.56	
Chromium	7440-47-3	7.8	mg/kg	0.55		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55	
Chromium	7440-47-3	6.8	mg/kg	0.66		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66	
Chromium	7440-47-3	9.9	mg/kg	0.54		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.54	
Chromium	7440-47-3	14.9	mg/kg	0.56		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.56	
Chromium	7440-47-3	7.6	mg/kg	0.55		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55	
Chromium	7440-47-3	15.9	mg/kg	0.61		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.61	
Chromium	7440-47-3	12.85	mg/kg	0.605		PBOW99-SSW108	PBOW99SSW108PBOW99SSW	METALS	REGFD	10-Jun-99	0.5	1	0.605	
Chromium	7440-47-3	12.4	mg/kg	0.56		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.56	
Chromium	7440-47-3	9.05	mg/kg	0.44		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.22	
Chromium	7440-47-3	11.9	mg/kg	0.405		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.203	
Chromium	7440-47-3	14.9	mg/kg	0.421		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.21	
Chromium	7440-47-3	15.7	mg/kg	0.422	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211	
Chromium	7440-47-3	9.825	mg/kg	0.4335	JJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165	
Chromium	7440-47-3	13.9	mg/kg	0.476		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.238	
Chromium	7440-47-3	10.9	mg/kg	0.402	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	
Chromium	7440-47-3	14.7	mg/kg	0.46	J	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23	
Chromium	7440-47-3	16.2	mg/kg	0.462		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.231	
Chromium	7440-47-3	13	mg/kg	0.469	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.235	
Chromium	7440-47-3	6.8	mg/kg	0.461	J	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23	
Chromium	7440-47-3	18.8	mg/kg	0.444		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.222	
Chromium	7440-47-3	17.6	mg/kg	0.472	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	
Chromium	7440-47-3	4.96	mg/kg	0.467	J	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234	
Chromium	7440-47-3	22	mg/kg	0.474		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.237	
Chromium	7440-47-3	13.55	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	
Chromium	7440-47-3	7.64	mg/kg	0.486	J	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243	
Chromium	7440-47-3	18.6	mg/kg	0.468		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.234	
Chromium	7440-47-3	12.2	mg/kg	0.421		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.21	
Chromium	7440-47-3	5.09	mg/kg	0.525		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.262	
Chromium	7440-47-3	16.4	mg/kg	0.415		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.207	
Chromium	7440-47-3	11.7	mg/kg	0.482	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	
Chromium	7440-47-3	12.9	mg/kg	0.453	J	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227	
Chromium	7440-47-3	10.155	mg/kg	0.407		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.204	
Chrysene	218-01-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Chrysene	218-01-9	0.45	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	
Chrysene	218-01-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Chrysene	218-01-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Chrysene	218-01-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0159	U
Chrysene	218-01-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0159	U
Chrysene	218-01-9	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0148	U
Chrysene	218-01-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0159	U

Table E-2
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Chrysene	218-01-9	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0158 UU
Chrysene	218-01-9	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0156 U
Chrysene	218-01-9	0.117	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0151 J
Chrysene	218-01-9	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0157 U
Chrysene	218-01-9	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0154 U
Chrysene	218-01-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0159 U
Chrysene	218-01-9	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.016 U
Chrysene	218-01-9	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0154 U
Chrysene	218-01-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0148 U
Chrysene	218-01-9	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0159 U
Chrysene	218-01-9	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0157 U
Chrysene	218-01-9	0.0496	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01605 JJ
Chrysene	218-01-9	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0159 U
Chrysene	218-01-9	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0155 U
Chrysene	218-01-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0148 U
Chrysene	218-01-9	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.016 U
Chrysene	218-01-9	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.015 U
Chrysene	218-01-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0151 U
Chrysene	218-01-9	0.15	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0155 J
Chrysene	218-01-9	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.01475 UU
Cobalt	7440-48-4	2.75	mg/kg	5.5	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	5.5 U
Cobalt	7440-48-4	3.3	mg/kg	6.6	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	6.6 U
Cobalt	7440-48-4	2.75	mg/kg	5.5	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	5.5 U
Cobalt	7440-48-4	3.35	mg/kg	6.7	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	6.7 U
Cobalt	7440-48-4	4.56	mg/kg	0.176	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088
Cobalt	7440-48-4	10.2	mg/kg	0.162	J	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.081
Cobalt	7440-48-4	11.7	mg/kg	0.168	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.0842
Cobalt	7440-48-4	4.27	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843
Cobalt	7440-48-4	5.41	mg/kg	0.1735		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.0867
Cobalt	7440-48-4	9.07	mg/kg	0.19	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.0951
Cobalt	7440-48-4	3.61	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804
Cobalt	7440-48-4	9.24	mg/kg	0.184		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.0921
Cobalt	7440-48-4	10	mg/kg	0.185	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.0924
Cobalt	7440-48-4	3.41	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938
Cobalt	7440-48-4	2.4	mg/kg	0.184		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.0921
Cobalt	7440-48-4	12.4	mg/kg	0.178	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.0888
Cobalt	7440-48-4	4.83	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944
Cobalt	7440-48-4	2.89	mg/kg	0.187		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.0934
Cobalt	7440-48-4	13.2	mg/kg	0.189	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.0947
Cobalt	7440-48-4	3.125	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645
Cobalt	7440-48-4	2.21	mg/kg	0.194		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.0971
Cobalt	7440-48-4	11.1	mg/kg	0.187	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.0935
Cobalt	7440-48-4	5.26	mg/kg	0.168	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842
Cobalt	7440-48-4	2.91	mg/kg	0.21	J	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.105
Cobalt	7440-48-4	10.5	mg/kg	0.166	J	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.083
Cobalt	7440-48-4	3.15	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963
Cobalt	7440-48-4	2.76	mg/kg	0.181		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.0906
Cobalt	7440-48-4	7.99	mg/kg	0.163	JJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.0814
Copper	7440-50-8	10.3	mg/kg	2.7		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	2.7
Copper	7440-50-8	5.1	mg/kg	3.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	3.3
Copper	7440-50-8	5	mg/kg	2.8		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	2.8
Copper	7440-50-8	9.5	mg/kg	3.3		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	3.3
Copper	7440-50-8	4.64	mg/kg	0.44		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.22
Copper	7440-50-8	25.4	mg/kg	0.405		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.203
Copper	7440-50-8	28.7	mg/kg	0.421		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.21
Copper	7440-50-8	4.03	mg/kg	0.422		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211
Copper	7440-50-8	14	mg/kg	0.4335		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165
Copper	7440-50-8	26	mg/kg	0.476		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.238

Table E-2
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Copper	7440-50-8	6.46	mg/kg	0.402		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201	
Copper	7440-50-8	21.3	mg/kg	0.46		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23	
Copper	7440-50-8	28	mg/kg	0.462		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.231	
Copper	7440-50-8	3.92	mg/kg	0.469		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.235	
Copper	7440-50-8	3.96	mg/kg	0.461		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23	
Copper	7440-50-8	27	mg/kg	0.444		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.222	
Copper	7440-50-8	4.28	mg/kg	0.472		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236	
Copper	7440-50-8	5.1	mg/kg	0.467		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234	
Copper	7440-50-8	25.1	mg/kg	0.474		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.237	
Copper	7440-50-8	12.4	mg/kg	0.4825		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241	
Copper	7440-50-8	5.63	mg/kg	0.486		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243	
Copper	7440-50-8	26.1	mg/kg	0.468		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.234	
Copper	7440-50-8	5.3	mg/kg	0.421		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.21	
Copper	7440-50-8	6.2	mg/kg	0.525		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.262	
Copper	7440-50-8	28.9	mg/kg	0.415		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.207	
Copper	7440-50-8	3.26	mg/kg	0.482		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241	
Copper	7440-50-8	4.33	mg/kg	0.453		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227	
Copper	7440-50-8	21.75	mg/kg	0.407		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.204	
Dibenz(a,h)anthracene	53-70-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dibenz(a,h)anthracene	53-70-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dibenz(a,h)anthracene	53-70-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dibenz(a,h)anthracene	53-70-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dibenz(a,h)anthracene	53-70-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0906	U
Dibenz(a,h)anthracene	53-70-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0906	U
Dibenz(a,h)anthracene	53-70-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0843	U
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0905	U
Dibenz(a,h)anthracene	53-70-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0902	UU
Dibenz(a,h)anthracene	53-70-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0892	U
Dibenz(a,h)anthracene	53-70-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0861	U
Dibenz(a,h)anthracene	53-70-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0896	U
Dibenz(a,h)anthracene	53-70-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0877	U
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0905	U
Dibenz(a,h)anthracene	53-70-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0913	U
Dibenz(a,h)anthracene	53-70-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0879	U
Dibenz(a,h)anthracene	53-70-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0846	U
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0905	U
Dibenz(a,h)anthracene	53-70-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0897	U
Dibenz(a,h)anthracene	53-70-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.09145	UU
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0905	U
Dibenz(a,h)anthracene	53-70-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0884	U
Dibenz(a,h)anthracene	53-70-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0846	U
Dibenz(a,h)anthracene	53-70-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0913	U
Dibenz(a,h)anthracene	53-70-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0857	U
Dibenz(a,h)anthracene	53-70-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0862	U
Dibenz(a,h)anthracene	53-70-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0887	U
Dibenz(a,h)anthracene	53-70-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.08415	UU
Dibenzofuran	132-64-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dibenzofuran	132-64-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dibenzofuran	132-64-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dibenzofuran	132-64-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dibenzofuran	132-64-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00674	U
Dibenzofuran	132-64-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00674	U
Dibenzofuran	132-64-9	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00627	U
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00673	U
Dibenzofuran	132-64-9	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00671	UU
Dibenzofuran	132-64-9	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00663	U
Dibenzofuran	132-64-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0064	U
Dibenzofuran	132-64-9	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00667	U

Dibenzofuran	132-64-9	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00652 U
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00673 U
Dibenzofuran	132-64-9	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00679 U
Dibenzofuran	132-64-9	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00654 U
Dibenzofuran	132-64-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00629 U
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00673 U
Dibenzofuran	132-64-9	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00667 U
Dibenzofuran	132-64-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0068 UU
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00673 U
Dibenzofuran	132-64-9	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00657 U
Dibenzofuran	132-64-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00629 U
Dibenzofuran	132-64-9	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00679 U
Dibenzofuran	132-64-9	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00638 U
Dibenzofuran	132-64-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00641 U
Dibenzofuran	132-64-9	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0066 U
Dibenzofuran	132-64-9	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00626 UU
Dibromochloromethane	124-48-1	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dibromochloromethane	124-48-1	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dibromochloromethane	124-48-1	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichlorobenzene, 1,2-	95-50-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,2-	95-50-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dichlorobenzene, 1,2-	95-50-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dichlorobenzene, 1,2-	95-50-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,2-	95-50-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00927 U
Dichlorobenzene, 1,2-	95-50-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00927 U
Dichlorobenzene, 1,2-	95-50-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00863 U
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00925 U
Dichlorobenzene, 1,2-	95-50-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00923 UU
Dichlorobenzene, 1,2-	95-50-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00912 U
Dichlorobenzene, 1,2-	95-50-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0088 U
Dichlorobenzene, 1,2-	95-50-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00917 U
Dichlorobenzene, 1,2-	95-50-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00896 U
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00926 U
Dichlorobenzene, 1,2-	95-50-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00933 U
Dichlorobenzene, 1,2-	95-50-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00899 U
Dichlorobenzene, 1,2-	95-50-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00865 U
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00926 U
Dichlorobenzene, 1,2-	95-50-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00917 U
Dichlorobenzene, 1,2-	95-50-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00935 UU
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00926 U
Dichlorobenzene, 1,2-	95-50-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00904 U
Dichlorobenzene, 1,2-	95-50-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00865 U
Dichlorobenzene, 1,2-	95-50-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00934 U
Dichlorobenzene, 1,2-	95-50-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00877 U
Dichlorobenzene, 1,2-	95-50-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00881 U
Dichlorobenzene, 1,2-	95-50-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00907 U
Dichlorobenzene, 1,2-	95-50-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.008605 UU
Dichlorobenzene, 1,3-	541-73-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,3-	541-73-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dichlorobenzene, 1,3-	541-73-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dichlorobenzene, 1,3-	541-73-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,3-	541-73-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0146 U
Dichlorobenzene, 1,3-	541-73-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0146 U
Dichlorobenzene, 1,3-	541-73-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0136 U
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0145 U
Dichlorobenzene, 1,3-	541-73-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0145 UU
Dichlorobenzene, 1,3-	541-73-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0143 U
Dichlorobenzene, 1,3-	541-73-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0138 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dichlorobenzene, 1,3-	541-73-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0144 U
Dichlorobenzene, 1,3-	541-73-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0141 U
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0145 U
Dichlorobenzene, 1,3-	541-73-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0147 U
Dichlorobenzene, 1,3-	541-73-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0141 U
Dichlorobenzene, 1,3-	541-73-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0136 U
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0145 U
Dichlorobenzene, 1,3-	541-73-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0144 U
Dichlorobenzene, 1,3-	541-73-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0147 UU
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0145 U
Dichlorobenzene, 1,3-	541-73-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0142 U
Dichlorobenzene, 1,3-	541-73-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0136 U
Dichlorobenzene, 1,3-	541-73-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0147 U
Dichlorobenzene, 1,3-	541-73-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0138 U
Dichlorobenzene, 1,3-	541-73-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0138 U
Dichlorobenzene, 1,3-	541-73-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0143 U
Dichlorobenzene, 1,3-	541-73-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0135 UU
Dichlorobenzene, 1,4-	106-46-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,4-	106-46-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dichlorobenzene, 1,4-	106-46-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dichlorobenzene, 1,4-	106-46-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzene, 1,4-	106-46-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00782 U
Dichlorobenzene, 1,4-	106-46-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00782 U
Dichlorobenzene, 1,4-	106-46-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00728 U
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00781 U
Dichlorobenzene, 1,4-	106-46-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00779 UU
Dichlorobenzene, 1,4-	106-46-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0077 U
Dichlorobenzene, 1,4-	106-46-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00743 U
Dichlorobenzene, 1,4-	106-46-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00774 U
Dichlorobenzene, 1,4-	106-46-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00757 U
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00781 U
Dichlorobenzene, 1,4-	106-46-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00788 U
Dichlorobenzene, 1,4-	106-46-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00759 U
Dichlorobenzene, 1,4-	106-46-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0073 U
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00782 U
Dichlorobenzene, 1,4-	106-46-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00774 U
Dichlorobenzene, 1,4-	106-46-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.007895 UU
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00781 U
Dichlorobenzene, 1,4-	106-46-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00763 U
Dichlorobenzene, 1,4-	106-46-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0073 U
Dichlorobenzene, 1,4-	106-46-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00788 U
Dichlorobenzene, 1,4-	106-46-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0074 U
Dichlorobenzene, 1,4-	106-46-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00744 U
Dichlorobenzene, 1,4-	106-46-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00766 U
Dichlorobenzene, 1,4-	106-46-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.007265 UU
Dichlorobenzidine, 3,3'-	91-94-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzidine, 3,3'-	91-94-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dichlorobenzidine, 3,3'-	91-94-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dichlorobenzidine, 3,3'-	91-94-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorobenzidine, 3,3'-	91-94-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0397 U
Dichlorobenzidine, 3,3'-	91-94-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0397 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1865	mg/kg	0.373	UJ	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.037 U
Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0397 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03955 UU
Dichlorobenzidine, 3,3'-	91-94-1	0.197	mg/kg	0.394	UJ	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0391 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0377 U
Dichlorobenzidine, 3,3'-	91-94-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0393 U
Dichlorobenzidine, 3,3'-	91-94-1	0.194	mg/kg	0.388	UJ	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0384 U

Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0397 U
Dichlorobenzidine, 3,3'-	91-94-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.04 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0385 U
Dichlorobenzidine, 3,3'-	91-94-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0371 U
Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0397 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1985	mg/kg	0.397	UJ	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0393 U
Dichlorobenzidine, 3,3'-	91-94-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0401 UU
Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0397 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0387 U
Dichlorobenzidine, 3,3'-	91-94-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0371 U
Dichlorobenzidine, 3,3'-	91-94-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.04 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1895	mg/kg	0.379	UJ	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0376 U
Dichlorobenzidine, 3,3'-	91-94-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0378 U
Dichlorobenzidine, 3,3'-	91-94-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0389 U
Dichlorobenzidine, 3,3'-	91-94-1	0.18625	mg/kg	0.3725	UJUJ	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0369 UU
Dichloroethane, 1,1-	75-34-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethane, 1,1-	75-34-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloroethane, 1,1-	75-34-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethane, 1,2-	107-06-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethane, 1,2-	107-06-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloroethane, 1,2-	107-06-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethene, 1,1-	75-35-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethene, 1,1-	75-35-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloroethene, 1,1-	75-35-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethene, cis-1,2-	156-59-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethene, cis-1,2-	156-59-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloroethene, cis-1,2-	156-59-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethene, trans-1,2-	156-60-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloroethene, trans-1,2-	156-60-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloroethene, trans-1,2-	156-60-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichlorophenol, 2,4-	120-83-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorophenol, 2,4-	120-83-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dichlorophenol, 2,4-	120-83-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dichlorophenol, 2,4-	120-83-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dichlorophenol, 2,4-	120-83-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0143 U
Dichlorophenol, 2,4-	120-83-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0143 U
Dichlorophenol, 2,4-	120-83-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0133 U
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0143 U
Dichlorophenol, 2,4-	120-83-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01425 UU
Dichlorophenol, 2,4-	120-83-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0141 U
Dichlorophenol, 2,4-	120-83-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0136 U
Dichlorophenol, 2,4-	120-83-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0142 U
Dichlorophenol, 2,4-	120-83-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139 U
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0143 U
Dichlorophenol, 2,4-	120-83-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0144 U
Dichlorophenol, 2,4-	120-83-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139 U
Dichlorophenol, 2,4-	120-83-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0134 U
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0143 U
Dichlorophenol, 2,4-	120-83-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0142 U
Dichlorophenol, 2,4-	120-83-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01445 UU
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0143 U
Dichlorophenol, 2,4-	120-83-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.014 U
Dichlorophenol, 2,4-	120-83-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0134 U
Dichlorophenol, 2,4-	120-83-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0144 U
Dichlorophenol, 2,4-	120-83-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0135 U
Dichlorophenol, 2,4-	120-83-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0136 U
Dichlorophenol, 2,4-	120-83-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.014 U
Dichlorophenol, 2,4-	120-83-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0133 UU

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dichloropropane, 1,2-	78-87-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloropropane, 1,2-	78-87-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloropropane, 1,2-	78-87-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloropropene, cis-1,3-	10061-01-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloropropene, cis-1,3-	10061-01-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloropropene, cis-1,3-	10061-01-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloropropene, trans-1,3-	10061-02-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Dichloropropene, trans-1,3-	10061-02-6	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Dichloropropene, trans-1,3-	10061-02-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Diethyl phthalate	84-66-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Diethyl phthalate	84-66-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Diethyl phthalate	84-66-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Diethyl phthalate	84-66-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Diethyl phthalate	84-66-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0163 U
Diethyl phthalate	84-66-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0162 U
Diethyl phthalate	84-66-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0151 U
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0162 U
Diethyl phthalate	84-66-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0162 UU
Diethyl phthalate	84-66-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.016 U
Diethyl phthalate	84-66-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0154 U
Diethyl phthalate	84-66-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0161 U
Diethyl phthalate	84-66-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0157 U
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0162 U
Diethyl phthalate	84-66-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0164 U
Diethyl phthalate	84-66-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0158 U
Diethyl phthalate	84-66-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0152 U
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0162 U
Diethyl phthalate	84-66-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0161 U
Diethyl phthalate	84-66-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0164 UU
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0162 U
Diethyl phthalate	84-66-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0158 U
Diethyl phthalate	84-66-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0152 U
Diethyl phthalate	84-66-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0164 U
Diethyl phthalate	84-66-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0154 U
Diethyl phthalate	84-66-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0155 U
Diethyl phthalate	84-66-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0159 U
Diethyl phthalate	84-66-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0151 UU
Dimethyl phthalate	131-11-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dimethyl phthalate	131-11-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Dimethyl phthalate	131-11-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Dimethyl phthalate	131-11-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Dimethyl phthalate	131-11-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0123 U
Dimethyl phthalate	131-11-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0123 U
Dimethyl phthalate	131-11-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0114 U
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0123 U
Dimethyl phthalate	131-11-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01225 UU
Dimethyl phthalate	131-11-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0121 U
Dimethyl phthalate	131-11-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0117 U
Dimethyl phthalate	131-11-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0121 U
Dimethyl phthalate	131-11-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0119 U
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0123 U
Dimethyl phthalate	131-11-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0124 U
Dimethyl phthalate	131-11-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0119 U
Dimethyl phthalate	131-11-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0115 U
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0123 U
Dimethyl phthalate	131-11-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0121 U
Dimethyl phthalate	131-11-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01235 UU
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0123 U

Dimethyl phthalate	131-11-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.012	U
Dimethyl phthalate	131-11-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0115	U
Dimethyl phthalate	131-11-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0124	U
Dimethyl phthalate	131-11-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0116	U
Dimethyl phthalate	131-11-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0117	U
Dimethyl phthalate	131-11-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.012	U
Dimethyl phthalate	131-11-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0114	UU
Dimethylphenol, 2,4-	105-67-9	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dimethylphenol, 2,4-	105-67-9	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dimethylphenol, 2,4-	105-67-9	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dimethylphenol, 2,4-	105-67-9	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dimethylphenol, 2,4-	105-67-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00986	U
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01055	UU
Dimethylphenol, 2,4-	105-67-9	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0104	U
Dimethylphenol, 2,4-	105-67-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0101	U
Dimethylphenol, 2,4-	105-67-9	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0105	U
Dimethylphenol, 2,4-	105-67-9	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0102	U
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0107	U
Dimethylphenol, 2,4-	105-67-9	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0103	U
Dimethylphenol, 2,4-	105-67-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00989	U
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0105	U
Dimethylphenol, 2,4-	105-67-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01065	UU
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0106	U
Dimethylphenol, 2,4-	105-67-9	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0103	U
Dimethylphenol, 2,4-	105-67-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00988	U
Dimethylphenol, 2,4-	105-67-9	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0107	U
Dimethylphenol, 2,4-	105-67-9	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.01	U
Dimethylphenol, 2,4-	105-67-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0101	U
Dimethylphenol, 2,4-	105-67-9	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0104	U
Dimethylphenol, 2,4-	105-67-9	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00984	UU
Di-n-butyl phthalate	84-74-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Di-n-butyl phthalate	84-74-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Di-n-butyl phthalate	84-74-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Di-n-butyl phthalate	84-74-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Di-n-butyl phthalate	84-74-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00867	U
Di-n-butyl phthalate	84-74-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00866	U
Di-n-butyl phthalate	84-74-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00807	U
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00865	U
Di-n-butyl phthalate	84-74-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.008625	UU
Di-n-butyl phthalate	84-74-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00853	U
Di-n-butyl phthalate	84-74-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00823	U
Di-n-butyl phthalate	84-74-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00857	U
Di-n-butyl phthalate	84-74-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00838	U
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00866	U
Di-n-butyl phthalate	84-74-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00873	U
Di-n-butyl phthalate	84-74-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00841	U
Di-n-butyl phthalate	84-74-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00809	U
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00866	U
Di-n-butyl phthalate	84-74-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00858	U
Di-n-butyl phthalate	84-74-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008745	UU
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00866	U
Di-n-butyl phthalate	84-74-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00845	U
Di-n-butyl phthalate	84-74-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00809	U

Di-n-butyl phthalate	84-74-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00873	U
Di-n-butyl phthalate	84-74-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0082	U
Di-n-butyl phthalate	84-74-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00824	U
Di-n-butyl phthalate	84-74-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00848	U
Di-n-butyl phthalate	84-74-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00805	UU
Dinitro-2-methylphenol, 4,6-	534-52-1	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0375	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.04015	UU
Dinitro-2-methylphenol, 4,6-	534-52-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0397	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0383	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0399	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.039	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0406	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0391	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0376	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0399	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0407	UU
Dinitro-2-methylphenol, 4,6-	534-52-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0403	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0393	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0376	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0406	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0381	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0383	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0395	U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.03745	UU
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrobenzene, 1,3-	99-65-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrobenzene, 1,3-	99-65-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Dinitrobenzene, 1,3-	99-65-0	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149	U
Dinitrobenzene, 1,3-	99-65-0	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137	U
Dinitrobenzene, 1,3-	99-65-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Dinitrobenzene, 1,3-	99-65-0	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405	UU
Dinitrobenzene, 1,3-	99-65-0	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143	U
Dinitrobenzene, 1,3-	99-65-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Dinitrobenzene, 1,3-	99-65-0	0.922	mg/kg	0.296		WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148	
Dinitrobenzene, 1,3-	99-65-0	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149	U
Dinitrobenzene, 1,3-	99-65-0	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Dinitrobenzene, 1,3-	99-65-0	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14	U
Dinitrobenzene, 1,3-	99-65-0	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152	U
Dinitrobenzene, 1,3-	99-65-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dinitrobenzene, 1,3-	99-65-0	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153	U
Dinitrobenzene, 1,3-	99-65-0	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145	U
Dinitrobenzene, 1,3-	99-65-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Dinitrobenzene, 1,3-	99-65-0	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138	U
Dinitrobenzene, 1,3-	99-65-0	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138	U
Dinitrobenzene, 1,3-	99-65-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Dinitrobenzene, 1,3-	99-65-0	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159	U
Dinitrobenzene, 1,3-	99-65-0	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146	U
Dinitrobenzene, 1,3-	99-65-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Dinitrobenzene, 1,3-	99-65-0	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155	U
Dinitrobenzene, 1,3-	99-65-0	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445	UU
Dinitrophenol, 2,4-	51-28-5	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Dinitrophenol, 2,4-	51-28-5	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Dinitrophenol, 2,4-	51-28-5	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Dinitrophenol, 2,4-	51-28-5	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Dinitrophenol, 2,4-	51-28-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0639	U
Dinitrophenol, 2,4-	51-28-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0639	U
Dinitrophenol, 2,4-	51-28-5	0.1865	mg/kg	0.373	UJ	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0595	U
Dinitrophenol, 2,4-	51-28-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0638	U
Dinitrophenol, 2,4-	51-28-5	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.06365	UU
Dinitrophenol, 2,4-	51-28-5	0.197	mg/kg	0.394	UJ	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0629	U
Dinitrophenol, 2,4-	51-28-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0607	U
Dinitrophenol, 2,4-	51-28-5	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0632	U
Dinitrophenol, 2,4-	51-28-5	0.194	mg/kg	0.388	UJ	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0618	U
Dinitrophenol, 2,4-	51-28-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0638	U
Dinitrophenol, 2,4-	51-28-5	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0644	U
Dinitrophenol, 2,4-	51-28-5	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.062	U
Dinitrophenol, 2,4-	51-28-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0597	U
Dinitrophenol, 2,4-	51-28-5	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0639	U
Dinitrophenol, 2,4-	51-28-5	0.1985	mg/kg	0.397	UJ	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0633	U
Dinitrophenol, 2,4-	51-28-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0645	UU
Dinitrophenol, 2,4-	51-28-5	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0638	U
Dinitrophenol, 2,4-	51-28-5	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0623	U
Dinitrophenol, 2,4-	51-28-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0596	U
Dinitrophenol, 2,4-	51-28-5	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0644	U
Dinitrophenol, 2,4-	51-28-5	0.1895	mg/kg	0.379	UJ	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0605	U
Dinitrophenol, 2,4-	51-28-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0608	U
Dinitrophenol, 2,4-	51-28-5	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0625	U
Dinitrophenol, 2,4-	51-28-5	0.18625	mg/kg	0.3725	UJUJ	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.05935	UU
Dinitrotoluene, 2,4-	121-14-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dinitrotoluene, 2,4-	121-14-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dinitrotoluene, 2,4-	121-14-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dinitrotoluene, 2,4-	121-14-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dinitrotoluene, 2,4-	121-14-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0141	U
Dinitrotoluene, 2,4-	121-14-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0141	U
Dinitrotoluene, 2,4-	121-14-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0131	U
Dinitrotoluene, 2,4-	121-14-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0141	U
Dinitrotoluene, 2,4-	121-14-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01405	UU
Dinitrotoluene, 2,4-	121-14-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139	U
Dinitrotoluene, 2,4-	121-14-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0134	U
Dinitrotoluene, 2,4-	121-14-2	1.07	mg/kg	0.396		WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0139	
Dinitrotoluene, 2,4-	121-14-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0136	U
Dinitrotoluene, 2,4-	121-14-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0141	U
Dinitrotoluene, 2,4-	121-14-2	0.714	mg/kg	0.404		WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0142	
Dinitrotoluene, 2,4-	121-14-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0137	U
Dinitrotoluene, 2,4-	121-14-2	0.0375	mg/kg	0.374	J	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0131	J
Dinitrotoluene, 2,4-	121-14-2	2.39	mg/kg	0.4		WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0141	
Dinitrotoluene, 2,4-	121-14-2	0.301	mg/kg	0.397	J	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139	J

Dinitrotoluene, 2,4-	121-14-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01425	UU
Dinitrotoluene, 2,4-	121-14-2	0.219	mg/kg	0.4	J	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0141	J
Dinitrotoluene, 2,4-	121-14-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0137	U
Dinitrotoluene, 2,4-	121-14-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0131	U
Dinitrotoluene, 2,4-	121-14-2	1.11	mg/kg	0.404		WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0142	
Dinitrotoluene, 2,4-	121-14-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0133	U
Dinitrotoluene, 2,4-	121-14-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0134	U
Dinitrotoluene, 2,4-	121-14-2	0.0766	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0138	J
Dinitrotoluene, 2,4-	121-14-2	0.698	mg/kg	0.3725		WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0131	
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Dinitrotoluene, 2,4- exp	121-14-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,4- exp	121-14-2	0.15	mg/kg	0.3	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,4- exp	121-14-2	0.176	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		J
Dinitrotoluene, 2,4- exp	121-14-2	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Dinitrotoluene, 2,4- exp	121-14-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Dinitrotoluene, 2,4- exp	121-14-2	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149	U
Dinitrotoluene, 2,4- exp	121-14-2	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137	U
Dinitrotoluene, 2,4- exp	121-14-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Dinitrotoluene, 2,4- exp	121-14-2	1.188	mg/kg	0.2805	JJ	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405	
Dinitrotoluene, 2,4- exp	121-14-2	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143	U
Dinitrotoluene, 2,4- exp	121-14-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Dinitrotoluene, 2,4- exp	121-14-2	2.58	mg/kg	0.296		WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148	
Dinitrotoluene, 2,4- exp	121-14-2	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149	U
Dinitrotoluene, 2,4- exp	121-14-2	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Dinitrotoluene, 2,4- exp	121-14-2	2.09	mg/kg	0.28		WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14	
Dinitrotoluene, 2,4- exp	121-14-2	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152	U
Dinitrotoluene, 2,4- exp	121-14-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Dinitrotoluene, 2,4- exp	121-14-2	9.47	mg/kg	1.53		WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.765	
Dinitrotoluene, 2,4- exp	121-14-2	0.766	mg/kg	0.29		WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145	
Dinitrotoluene, 2,4- exp	121-14-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Dinitrotoluene, 2,4- exp	121-14-2	0.585	mg/kg	0.275		WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138	
Dinitrotoluene, 2,4- exp	121-14-2	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138	U
Dinitrotoluene, 2,4- exp	121-14-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Dinitrotoluene, 2,4- exp	121-14-2	3.87	mg/kg	0.317	J	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159	
Dinitrotoluene, 2,4- exp	121-14-2	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146	U
Dinitrotoluene, 2,4- exp	121-14-2	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Dinitrotoluene, 2,4- exp	121-14-2	0.192	mg/kg	0.311	J	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155	J
Dinitrotoluene, 2,4- exp	121-14-2	1.15	mg/kg	0.2885		WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445	
Dinitrotoluene, 2,6-	606-20-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dinitrotoluene, 2,6-	606-20-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Dinitrotoluene, 2,6-	606-20-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Dinitrotoluene, 2,6-	606-20-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Dinitrotoluene, 2,6-	606-20-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00963	U
Dinitrotoluene, 2,6-	606-20-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00963	U
Dinitrotoluene, 2,6-	606-20-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00896	U
Dinitrotoluene, 2,6-	606-20-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00961	U
Dinitrotoluene, 2,6-	606-20-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.009585	UU
Dinitrotoluene, 2,6-	606-20-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00948	U
Dinitrotoluene, 2,6-	606-20-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00914	U
Dinitrotoluene, 2,6-	606-20-2	0.0944	mg/kg	0.396	J	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00952	J
Dinitrotoluene, 2,6-	606-20-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00931	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dinitrotoluene, 2,6-	606-20-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00962 U
Dinitrotoluene, 2,6-	606-20-2	0.162	mg/kg	0.404	J	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0097 J
Dinitrotoluene, 2,6-	606-20-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00934 U
Dinitrotoluene, 2,6-	606-20-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00899 U
Dinitrotoluene, 2,6-	606-20-2	0.504	mg/kg	0.4		WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00962
Dinitrotoluene, 2,6-	606-20-2	0.0683	mg/kg	0.397	J	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00953 J
Dinitrotoluene, 2,6-	606-20-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00972 UU
Dinitrotoluene, 2,6-	606-20-2	0.0429	mg/kg	0.4	J	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00962 J
Dinitrotoluene, 2,6-	606-20-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00939 U
Dinitrotoluene, 2,6-	606-20-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00898 U
Dinitrotoluene, 2,6-	606-20-2	0.429	mg/kg	0.404		WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0097
Dinitrotoluene, 2,6-	606-20-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00911 U
Dinitrotoluene, 2,6-	606-20-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00916 U
Dinitrotoluene, 2,6-	606-20-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00942 U
Dinitrotoluene, 2,6-	606-20-2	0.08975	mg/kg	0.3725	JJ	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00894 JJ
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Dinitrotoluene, 2,6- exp	606-20-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,6- exp	606-20-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,6- exp	606-20-2	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,6- exp	606-20-2	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Dinitrotoluene, 2,6- exp	606-20-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Dinitrotoluene, 2,6- exp	606-20-2	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Dinitrotoluene, 2,6- exp	606-20-2	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Dinitrotoluene, 2,6- exp	606-20-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Dinitrotoluene, 2,6- exp	606-20-2	0.18825	mg/kg	0.2805	U/J	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UJ
Dinitrotoluene, 2,6- exp	606-20-2	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Dinitrotoluene, 2,6- exp	606-20-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Dinitrotoluene, 2,6- exp	606-20-2	0.272	mg/kg	0.296	J	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 J
Dinitrotoluene, 2,6- exp	606-20-2	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Dinitrotoluene, 2,6- exp	606-20-2	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
Dinitrotoluene, 2,6- exp	606-20-2	0.326	mg/kg	0.28		WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14
Dinitrotoluene, 2,6- exp	606-20-2	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Dinitrotoluene, 2,6- exp	606-20-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Dinitrotoluene, 2,6- exp	606-20-2	2.03	mg/kg	0.306		WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153
Dinitrotoluene, 2,6- exp	606-20-2	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Dinitrotoluene, 2,6- exp	606-20-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Dinitrotoluene, 2,6- exp	606-20-2	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Dinitrotoluene, 2,6- exp	606-20-2	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Dinitrotoluene, 2,6- exp	606-20-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Dinitrotoluene, 2,6- exp	606-20-2	1.48	mg/kg	0.317		WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159
Dinitrotoluene, 2,6- exp	606-20-2	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Dinitrotoluene, 2,6- exp	606-20-2	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Dinitrotoluene, 2,6- exp	606-20-2	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Dinitrotoluene, 2,6- exp	606-20-2	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Di-n-octyl phthalate	117-84-0	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Di-n-octyl phthalate	117-84-0	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Di-n-octyl phthalate	117-84-0	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Di-n-octyl phthalate	117-84-0	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Di-n-octyl phthalate	117-84-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0755 U
Di-n-octyl phthalate	117-84-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0754 U
Di-n-octyl phthalate	117-84-0	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0702 U

Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0754 U
Di-n-octyl phthalate	117-84-0	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.07515 UU
Di-n-octyl phthalate	117-84-0	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0743 U
Di-n-octyl phthalate	117-84-0	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0717 U
Di-n-octyl phthalate	117-84-0	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0746 U
Di-n-octyl phthalate	117-84-0	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.073 U
Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0754 U
Di-n-octyl phthalate	117-84-0	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.076 U
Di-n-octyl phthalate	117-84-0	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0732 U
Di-n-octyl phthalate	117-84-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0705 U
Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0754 U
Di-n-octyl phthalate	117-84-0	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0747 U
Di-n-octyl phthalate	117-84-0	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.07615 UU
Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0754 U
Di-n-octyl phthalate	117-84-0	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0736 U
Di-n-octyl phthalate	117-84-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0704 U
Di-n-octyl phthalate	117-84-0	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0761 U
Di-n-octyl phthalate	117-84-0	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0714 U
Di-n-octyl phthalate	117-84-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0718 U
Di-n-octyl phthalate	117-84-0	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0739 U
Di-n-octyl phthalate	117-84-0	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0701 UU
DIPHENYLAMINE	122-39-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0397 U
DIPHENYLAMINE	122-39-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0397 U
DIPHENYLAMINE	122-39-4	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.037 U
DIPHENYLAMINE	122-39-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0397 U
DIPHENYLAMINE	122-39-4	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03955 UU
DIPHENYLAMINE	122-39-4	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0391 U
DIPHENYLAMINE	122-39-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0377 U
DIPHENYLAMINE	122-39-4	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0393 U
DIPHENYLAMINE	122-39-4	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0384 U
DIPHENYLAMINE	122-39-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0397 U
DIPHENYLAMINE	122-39-4	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.04 U
DIPHENYLAMINE	122-39-4	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0385 U
DIPHENYLAMINE	122-39-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0371 U
DIPHENYLAMINE	122-39-4	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0397 U
DIPHENYLAMINE	122-39-4	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0393 U
DIPHENYLAMINE	122-39-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0401 UU
DIPHENYLAMINE	122-39-4	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0397 U
DIPHENYLAMINE	122-39-4	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0387 U
DIPHENYLAMINE	122-39-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0371 U
DIPHENYLAMINE	122-39-4	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.04 U
DIPHENYLAMINE	122-39-4	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0376 U
DIPHENYLAMINE	122-39-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0378 U
DIPHENYLAMINE	122-39-4	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0389 U
DIPHENYLAMINE	122-39-4	0.11385	mg/kg	0.3725	U/J	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0369 UJ
Ethylbenzene	100-41-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Ethylbenzene	100-41-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Ethylbenzene	100-41-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Fluoranthene	206-44-0	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Fluoranthene	206-44-0	1.2	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Fluoranthene	206-44-0	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Fluoranthene	206-44-0	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Fluoranthene	206-44-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00867 U
Fluoranthene	206-44-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00866 U
Fluoranthene	206-44-0	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00807 U
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00865 U
Fluoranthene	206-44-0	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.008625 UU
Fluoranthene	206-44-0	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00853 U

Fluoranthene	206-44-0	0.179	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00823 J
Fluoranthene	206-44-0	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00857 U
Fluoranthene	206-44-0	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00838 U
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00866 U
Fluoranthene	206-44-0	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00873 U
Fluoranthene	206-44-0	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00841 U
Fluoranthene	206-44-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00809 U
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00866 U
Fluoranthene	206-44-0	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00858 U
Fluoranthene	206-44-0	0.0903	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.008745 JJ
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00866 U
Fluoranthene	206-44-0	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00845 U
Fluoranthene	206-44-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00809 U
Fluoranthene	206-44-0	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00873 U
Fluoranthene	206-44-0	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0082 U
Fluoranthene	206-44-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00824 U
Fluoranthene	206-44-0	0.221	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00848 J
Fluoranthene	206-44-0	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00805 UU
Fluorene	86-73-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Fluorene	86-73-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Fluorene	86-73-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Fluorene	86-73-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Fluorene	86-73-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.017 U
Fluorene	86-73-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.017 U
Fluorene	86-73-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0158 U
Fluorene	86-73-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0169 U
Fluorene	86-73-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0169 UU
Fluorene	86-73-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0167 U
Fluorene	86-73-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0161 U
Fluorene	86-73-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0168 U
Fluorene	86-73-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0164 U
Fluorene	86-73-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.017 U
Fluorene	86-73-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0171 U
Fluorene	86-73-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0165 U
Fluorene	86-73-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0158 U
Fluorene	86-73-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.017 U
Fluorene	86-73-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0168 U
Fluorene	86-73-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01715 UU
Fluorene	86-73-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.017 U
Fluorene	86-73-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0165 U
Fluorene	86-73-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0158 U
Fluorene	86-73-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0171 U
Fluorene	86-73-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0161 U
Fluorene	86-73-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0161 U
Fluorene	86-73-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0166 U
Fluorene	86-73-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.01575 UU
Hexachlorobenzene	118-74-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Hexachlorobenzene	118-74-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Hexachlorobenzene	118-74-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Hexachlorobenzene	118-74-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Hexachlorobenzene	118-74-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0249 U
Hexachlorobenzene	118-74-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0249 U
Hexachlorobenzene	118-74-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0232 U
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0249 U
Hexachlorobenzene	118-74-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0248 UU
Hexachlorobenzene	118-74-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0245 U
Hexachlorobenzene	118-74-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0237 U
Hexachlorobenzene	118-74-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0246 U

Hexachlorobenzene	118-74-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0241	U
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0249	U
Hexachlorobenzene	118-74-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0251	U
Hexachlorobenzene	118-74-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0242	U
Hexachlorobenzene	118-74-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0233	U
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0249	U
Hexachlorobenzene	118-74-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0247	U
Hexachlorobenzene	118-74-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0251	UU
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0249	U
Hexachlorobenzene	118-74-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0243	U
Hexachlorobenzene	118-74-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0232	U
Hexachlorobenzene	118-74-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0251	U
Hexachlorobenzene	118-74-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0236	U
Hexachlorobenzene	118-74-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0237	U
Hexachlorobenzene	118-74-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0244	U
Hexachlorobenzene	118-74-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0231	UU
Hexachlorobutadiene	87-68-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorobutadiene	87-68-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachlorobutadiene	87-68-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachlorobutadiene	87-68-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorobutadiene	87-68-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.038	U
Hexachlorobutadiene	87-68-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.038	U
Hexachlorobutadiene	87-68-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0354	U
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.038	U
Hexachlorobutadiene	87-68-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03785	UU
Hexachlorobutadiene	87-68-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0374	U
Hexachlorobutadiene	87-68-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0361	U
Hexachlorobutadiene	87-68-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0376	U
Hexachlorobutadiene	87-68-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0368	U
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.038	U
Hexachlorobutadiene	87-68-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0383	U
Hexachlorobutadiene	87-68-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0369	U
Hexachlorobutadiene	87-68-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0355	U
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.038	U
Hexachlorobutadiene	87-68-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0376	U
Hexachlorobutadiene	87-68-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03835	UU
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.038	U
Hexachlorobutadiene	87-68-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0371	U
Hexachlorobutadiene	87-68-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0355	U
Hexachlorobutadiene	87-68-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0383	U
Hexachlorobutadiene	87-68-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.036	U
Hexachlorobutadiene	87-68-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0362	U
Hexachlorobutadiene	87-68-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0372	U
Hexachlorobutadiene	87-68-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0353	UU
Hexachlorocyclopentadiene	77-47-4	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorocyclopentadiene	77-47-4	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachlorocyclopentadiene	77-47-4	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachlorocyclopentadiene	77-47-4	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachlorocyclopentadiene	77-47-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0128	U
Hexachlorocyclopentadiene	77-47-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0128	U
Hexachlorocyclopentadiene	77-47-4	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0119	U
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0127	U
Hexachlorocyclopentadiene	77-47-4	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0127	UU
Hexachlorocyclopentadiene	77-47-4	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0126	U
Hexachlorocyclopentadiene	77-47-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0121	U
Hexachlorocyclopentadiene	77-47-4	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0126	U
Hexachlorocyclopentadiene	77-47-4	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0123	U
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0127	U

Hexachlorocyclopentadiene	77-47-4	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0128	U
Hexachlorocyclopentadiene	77-47-4	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0124	U
Hexachlorocyclopentadiene	77-47-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0119	U
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0127	U
Hexachlorocyclopentadiene	77-47-4	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0126	U
Hexachlorocyclopentadiene	77-47-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01285	UU
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0127	U
Hexachlorocyclopentadiene	77-47-4	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0124	U
Hexachlorocyclopentadiene	77-47-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0119	U
Hexachlorocyclopentadiene	77-47-4	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0129	U
Hexachlorocyclopentadiene	77-47-4	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0121	U
Hexachlorocyclopentadiene	77-47-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0121	U
Hexachlorocyclopentadiene	77-47-4	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0125	U
Hexachlorocyclopentadiene	77-47-4	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.01185	UU
Hexachloroethane	67-72-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachloroethane	67-72-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Hexachloroethane	67-72-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Hexachloroethane	67-72-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Hexachloroethane	67-72-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0123	U
Hexachloroethane	67-72-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0123	U
Hexachloroethane	67-72-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0114	U
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0123	U
Hexachloroethane	67-72-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01225	UU
Hexachloroethane	67-72-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0121	U
Hexachloroethane	67-72-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0117	U
Hexachloroethane	67-72-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0121	U
Hexachloroethane	67-72-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0119	U
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0123	U
Hexachloroethane	67-72-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0124	U
Hexachloroethane	67-72-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0119	U
Hexachloroethane	67-72-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0115	U
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0123	U
Hexachloroethane	67-72-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0121	U
Hexachloroethane	67-72-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01235	UU
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0123	U
Hexachloroethane	67-72-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.012	U
Hexachloroethane	67-72-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0115	U
Hexachloroethane	67-72-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0124	U
Hexachloroethane	67-72-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0116	U
Hexachloroethane	67-72-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0117	U
Hexachloroethane	67-72-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.012	U
Hexachloroethane	67-72-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0114	UU
Hexanone, 2-	591-78-6	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
Hexanone, 2-	591-78-6	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013	U
Hexanone, 2-	591-78-6	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	5	mg/kg	10	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	10	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5	U
HMX	2691-41-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
HMX	2691-41-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U

HMX	2691-41-0	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
HMX	2691-41-0	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
HMX	2691-41-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
HMX	2691-41-0	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
HMX	2691-41-0	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
HMX	2691-41-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
HMX	2691-41-0	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 U
HMX	2691-41-0	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
HMX	2691-41-0	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
HMX	2691-41-0	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14 U
HMX	2691-41-0	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
HMX	2691-41-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
HMX	2691-41-0	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
HMX	2691-41-0	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
HMX	2691-41-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
HMX	2691-41-0	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
HMX	2691-41-0	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
HMX	2691-41-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
HMX	2691-41-0	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
HMX	2691-41-0	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
HMX	2691-41-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
HMX	2691-41-0	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
HMX	2691-41-0	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Indeno(1,2,3-cd)pyrene	193-39-5	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.13 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.13 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.121 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.13 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.1295 UU
Indeno(1,2,3-cd)pyrene	193-39-5	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.128 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.295	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.123 J
Indeno(1,2,3-cd)pyrene	193-39-5	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.129 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.126 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.13 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.131 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.126 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.121 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.13 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.129 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.271	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1315 JJ
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.13 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.127 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.121 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.131 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.123 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.124 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.343	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.127 J
Indeno(1,2,3-cd)pyrene	193-39-5	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.121 UU
Iron	7439-89-6	10500	mg/kg	10.9		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	10.9
Iron	7439-89-6	8110	mg/kg	13.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	13.3
Iron	7439-89-6	10100	mg/kg	11.1		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	11.1
Iron	7439-89-6	16400	mg/kg	13.4		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	13.4
Iron	7439-89-6	12600	mg/kg	1.76	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.88
Iron	7439-89-6	16800	mg/kg	1.62	J	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.81
Iron	7439-89-6	25200	mg/kg	1.68	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.842

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Iron	7439-89-6	18300	mg/kg	1.69	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.843
Iron	7439-89-6	14800	mg/kg	1.735	JJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.867
Iron	7439-89-6	18500	mg/kg	1.9	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.951
Iron	7439-89-6	12000	mg/kg	1.61	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.804
Iron	7439-89-6	21000	mg/kg	1.84	J	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.921
Iron	7439-89-6	21600	mg/kg	1.85	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.924
Iron	7439-89-6	16400	mg/kg	1.88	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.938
Iron	7439-89-6	9280	mg/kg	1.84	J	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.921
Iron	7439-89-6	25600	mg/kg	1.78	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.888
Iron	7439-89-6	28600	mg/kg	1.89	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.944
Iron	7439-89-6	6480	mg/kg	1.87	J	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.934
Iron	7439-89-6	27200	mg/kg	1.89	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.947
Iron	7439-89-6	15350	mg/kg	1.93	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.9645
Iron	7439-89-6	9910	mg/kg	1.94	J	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.971
Iron	7439-89-6	23300	mg/kg	1.87	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.935
Iron	7439-89-6	18200	mg/kg	1.68	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.842
Iron	7439-89-6	7080	mg/kg	2.1	J	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	1.05
Iron	7439-89-6	23700	mg/kg	1.66	J	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.83
Iron	7439-89-6	12500	mg/kg	1.93	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.963
Iron	7439-89-6	13600	mg/kg	1.81	J	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.906
Iron	7439-89-6	18400	mg/kg	1.63	JJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.814
Isophorone	78-59-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Isophorone	78-59-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Isophorone	78-59-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Isophorone	78-59-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Isophorone	78-59-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00482 U
Isophorone	78-59-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00481 U
Isophorone	78-59-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00448 U
Isophorone	78-59-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00481 U
Isophorone	78-59-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.004795 UU
Isophorone	78-59-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00474 U
Isophorone	78-59-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00457 U
Isophorone	78-59-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00476 U
Isophorone	78-59-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00466 U
Isophorone	78-59-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00481 U
Isophorone	78-59-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00485 U
Isophorone	78-59-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00467 U
Isophorone	78-59-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00449 U
Isophorone	78-59-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00481 U
Isophorone	78-59-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00476 U
Isophorone	78-59-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00486 UU
Isophorone	78-59-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00481 U
Isophorone	78-59-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00469 U
Isophorone	78-59-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00449 U
Isophorone	78-59-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00485 U
Isophorone	78-59-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00455 U
Isophorone	78-59-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00458 U
Isophorone	78-59-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00471 U
Isophorone	78-59-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00447 UU
Lead	7439-92-1	56.9	mg/kg	0.34		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.34
Lead	7439-92-1	19.8	mg/kg	0.33		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.33
Lead	7439-92-1	12	mg/kg	0.4		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.4
Lead	7439-92-1	25.4	mg/kg	0.33		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.33
Lead	7439-92-1	107	mg/kg	0.33		PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.33
Lead	7439-92-1	28	mg/kg	0.33		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.33
Lead	7439-92-1	115	mg/kg	0.36		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.36
Lead	7439-92-1	96.05	mg/kg	0.365		PBOW99-SSW108	PBOW99SSW108PBOW99SSV	METALS	REGFD	10-Jun-99	0.5	1	0.365
Lead	7439-92-1	39.7	mg/kg	0.34		PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.34

Table E-2
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Lead	7439-92-1	3.05	mg/kg	0.49		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245
Lead	7439-92-1	11.9	mg/kg	0.45		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.225
Lead	7439-92-1	12.1	mg/kg	0.458		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.229
Lead	7439-92-1	4.24	mg/kg	0.422	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211
Lead	7439-92-1	6.76	mg/kg	0.4335	JJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165
Lead	7439-92-1	14.3	mg/kg	0.479		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.24
Lead	7439-92-1	13.2	mg/kg	0.402	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201
Lead	7439-92-1	7.49	mg/kg	0.46	J	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23
Lead	7439-92-1	11.8	mg/kg	0.41		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.205
Lead	7439-92-1	5.04	mg/kg	0.484	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242
Lead	7439-92-1	4.73	mg/kg	0.461	J	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23
Lead	7439-92-1	12.1	mg/kg	0.476		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.238
Lead	7439-92-1	1.83	mg/kg	0.472	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236
Lead	7439-92-1	6.94	mg/kg	0.467	J	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234
Lead	7439-92-1	11.3	mg/kg	0.466		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.233
Lead	7439-92-1	51.6	mg/kg	0.4825	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241
Lead	7439-92-1	17.7	mg/kg	0.486	J	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243
Lead	7439-92-1	11.8	mg/kg	0.45		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.225
Lead	7439-92-1	2.02	mg/kg	0.457		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229
Lead	7439-92-1	4.88	mg/kg	0.468		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.234
Lead	7439-92-1	12.7	mg/kg	0.401		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.2
Lead	7439-92-1	7.11	mg/kg	0.482	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241
Lead	7439-92-1	8.13	mg/kg	0.453	J	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227
Lead	7439-92-1	10.75	mg/kg	0.4235		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.212
Magnesium	7439-95-4	1710	mg/kg	546		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546
Magnesium	7439-95-4	1180	mg/kg	663		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663
Magnesium	7439-95-4	2080	mg/kg	555		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555
Magnesium	7439-95-4	2380	mg/kg	670		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670
Magnesium	7439-95-4	4160	mg/kg	1.76		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.88
Magnesium	7439-95-4	18900	mg/kg	1.62		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.81
Magnesium	7439-95-4	9700	mg/kg	1.68		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.842
Magnesium	7439-95-4	830	mg/kg	1.69	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.843
Magnesium	7439-95-4	14100	mg/kg	1.735	JJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.867
Magnesium	7439-95-4	17700	mg/kg	1.9		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.951
Magnesium	7439-95-4	2320	mg/kg	1.61	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.804
Magnesium	7439-95-4	11400	mg/kg	1.84	J	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.921
Magnesium	7439-95-4	12700	mg/kg	1.85		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.924
Magnesium	7439-95-4	1140	mg/kg	1.88	J	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.938
Magnesium	7439-95-4	8310	mg/kg	1.84		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.921
Magnesium	7439-95-4	10700	mg/kg	1.78		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.888
Magnesium	7439-95-4	692	mg/kg	1.89	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.944
Magnesium	7439-95-4	10600	mg/kg	1.87	J	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.934
Magnesium	7439-95-4	11000	mg/kg	1.89		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.947
Magnesium	7439-95-4	965.5	mg/kg	1.93	JJ	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.9645
Magnesium	7439-95-4	8360	mg/kg	1.94	J	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.971
Magnesium	7439-95-4	13200	mg/kg	1.87		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.935
Magnesium	7439-95-4	792	mg/kg	1.68		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.842
Magnesium	7439-95-4	15000	mg/kg	2.1		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	1.05
Magnesium	7439-95-4	11000	mg/kg	1.66		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.83
Magnesium	7439-95-4	858	mg/kg	1.93	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.963
Magnesium	7439-95-4	2740	mg/kg	1.81	J	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.906
Magnesium	7439-95-4	11650	mg/kg	1.63		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.814
Manganese	7439-96-5	202	mg/kg	1.6		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.6
Manganese	7439-96-5	118	mg/kg	2		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	2
Manganese	7439-96-5	166	mg/kg	1.7		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.7
Manganese	7439-96-5	257	mg/kg	2		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	2
Manganese	7439-96-5	300	mg/kg	0.176	J	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088
Manganese	7439-96-5	402	mg/kg	0.162	J	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.081

Table E-2
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Manganese	7439-96-5	379	mg/kg	0.168	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.0842
Manganese	7439-96-5	157	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843
Manganese	7439-96-5	308.5	mg/kg	0.1735		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.0867
Manganese	7439-96-5	433	mg/kg	0.19	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.0951
Manganese	7439-96-5	411	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804
Manganese	7439-96-5	393	mg/kg	0.184		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.0921
Manganese	7439-96-5	429	mg/kg	0.185	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.0924
Manganese	7439-96-5	122	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938
Manganese	7439-96-5	123	mg/kg	0.184		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.0921
Manganese	7439-96-5	396	mg/kg	0.178	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.0888
Manganese	7439-96-5	235	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944
Manganese	7439-96-5	216	mg/kg	0.187		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.0934
Manganese	7439-96-5	399	mg/kg	0.189	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.0947
Manganese	7439-96-5	104.5	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645
Manganese	7439-96-5	182	mg/kg	0.194		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.0971
Manganese	7439-96-5	456	mg/kg	0.187	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.0935
Manganese	7439-96-5	519	mg/kg	0.168	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842
Manganese	7439-96-5	194	mg/kg	0.21	J	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.105
Manganese	7439-96-5	491	mg/kg	0.166	J	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.083
Manganese	7439-96-5	150	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963
Manganese	7439-96-5	84.2	mg/kg	0.181		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.0906
Manganese	7439-96-5	417	mg/kg	0.163	JJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.0814
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	1.3	mg/kg	0.11		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.11
Mercury	7439-97-6	0.065	mg/kg	0.13	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.13 U
Mercury	7439-97-6	0.15	mg/kg	0.11		PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.11
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	0.16	mg/kg	0.12		PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.12
Mercury	7439-97-6	0.27	mg/kg	0.12		PBOW99-SSW108	PBOW99SSW108PBOW99SSW	METALS	REGFD	10-Jun-99	0.5	1	0.12
Mercury	7439-97-6	0.055	mg/kg	0.11	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.11 U
Mercury	7439-97-6	0.01145	mg/kg	0.0229	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.0115 U
Mercury	7439-97-6	0.0122	mg/kg	0.0244	U	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.0122 U
Mercury	7439-97-6	0.0118	mg/kg	0.0196	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.00981 J
Mercury	7439-97-6	0.0188	mg/kg	0.0225	J	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0113 J
Mercury	7439-97-6	0.01065	mg/kg	0.0213	UU	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.01065 UU
Mercury	7439-97-6	0.0111	mg/kg	0.0222	U	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.0111 U
Mercury	7439-97-6	0.0207	mg/kg	0.0211	J	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0105 J
Mercury	7439-97-6	0.01105	mg/kg	0.0221	U	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.0111 U
Mercury	7439-97-6	0.0114	mg/kg	0.0209	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.0105 J
Mercury	7439-97-6	0.0116	mg/kg	0.0232	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0116 U
Mercury	7439-97-6	0.0113	mg/kg	0.0226	U	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.0113 U
Mercury	7439-97-6	0.0116	mg/kg	0.0216	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.0108 J
Mercury	7439-97-6	0.0166	mg/kg	0.0226	J	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0113 J
Mercury	7439-97-6	0.0191	mg/kg	0.0218	J	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.0109 J
Mercury	7439-97-6	0.0115	mg/kg	0.0227	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.0114 J
Mercury	7439-97-6	0.06495	mg/kg	0.0222		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.0111
Mercury	7439-97-6	0.011	mg/kg	0.022	U	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.011 U
Mercury	7439-97-6	0.0121	mg/kg	0.0213	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.0107 J
Mercury	7439-97-6	0.0201	mg/kg	0.0216	J	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0108 J
Mercury	7439-97-6	0.0118	mg/kg	0.0236	U	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.0118 U
Mercury	7439-97-6	0.01145	mg/kg	0.0229	U	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.0115 U
Mercury	7439-97-6	0.0146	mg/kg	0.0202	J	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0101 J
Mercury	7439-97-6	0.01145	mg/kg	0.0229	U	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.0115 U
Mercury	7439-97-6	0.01113	mg/kg	0.02225	UU	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.01115 UU
Methyl-2-pentanone, 4-	108-10-1	0.0055	mg/kg	0.011	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U
Methyl-2-pentanone, 4-	108-10-1	0.0065	mg/kg	0.013	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.013 U
Methyl-2-pentanone, 4-	108-10-1	0.0055	mg/kg	0.011	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.011 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Methylene chloride	75-09-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Methylene chloride	75-09-2	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Methylene chloride	75-09-2	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Methylnaphthalene, 2-	91-57-6	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylnaphthalene, 2-	91-57-6	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Methylnaphthalene, 2-	91-57-6	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Methylnaphthalene, 2-	91-57-6	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylnaphthalene, 2-	91-57-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.105 U
Methylnaphthalene, 2-	91-57-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.105 U
Methylnaphthalene, 2-	91-57-6	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0979 U
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.105 U
Methylnaphthalene, 2-	91-57-6	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.1045 UU
Methylnaphthalene, 2-	91-57-6	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.104 U
Methylnaphthalene, 2-	91-57-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0999 U
Methylnaphthalene, 2-	91-57-6	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.104 U
Methylnaphthalene, 2-	91-57-6	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.102 U
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.105 U
Methylnaphthalene, 2-	91-57-6	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.106 U
Methylnaphthalene, 2-	91-57-6	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.102 U
Methylnaphthalene, 2-	91-57-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0982 U
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.105 U
Methylnaphthalene, 2-	91-57-6	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.104 U
Methylnaphthalene, 2-	91-57-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1065 UU
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.105 U
Methylnaphthalene, 2-	91-57-6	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.103 U
Methylnaphthalene, 2-	91-57-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0981 U
Methylnaphthalene, 2-	91-57-6	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.106 U
Methylnaphthalene, 2-	91-57-6	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0995 U
Methylnaphthalene, 2-	91-57-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.1 U
Methylnaphthalene, 2-	91-57-6	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.103 U
Methylnaphthalene, 2-	91-57-6	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0977 UU
Methylphenol, 2-	95-48-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 2-	95-48-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Methylphenol, 2-	95-48-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Methylphenol, 2-	95-48-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 2-	95-48-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00602 U
Methylphenol, 2-	95-48-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00602 U
Methylphenol, 2-	95-48-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0056 U
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00601 U
Methylphenol, 2-	95-48-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00599 UU
Methylphenol, 2-	95-48-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00592 U
Methylphenol, 2-	95-48-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00572 U
Methylphenol, 2-	95-48-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00595 U
Methylphenol, 2-	95-48-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00582 U
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00601 U
Methylphenol, 2-	95-48-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00606 U
Methylphenol, 2-	95-48-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00584 U
Methylphenol, 2-	95-48-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00562 U
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00601 U
Methylphenol, 2-	95-48-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00596 U
Methylphenol, 2-	95-48-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.006075 UU
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00601 U
Methylphenol, 2-	95-48-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00587 U
Methylphenol, 2-	95-48-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00561 U
Methylphenol, 2-	95-48-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00606 U
Methylphenol, 2-	95-48-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00569 U
Methylphenol, 2-	95-48-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00572 U
Methylphenol, 2-	95-48-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00589 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Methylphenol, 2-	95-48-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00559 UU
Methylphenol, 4-	106-44-5	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 4-	106-44-5	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Methylphenol, 4-	106-44-5	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Methylphenol, 4-	106-44-5	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Methylphenol, 4-	106-44-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0125 U
Methylphenol, 4-	106-44-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0125 U
Methylphenol, 4-	106-44-5	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0116 U
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0125 U
Methylphenol, 4-	106-44-5	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01245 UU
Methylphenol, 4-	106-44-5	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0123 U
Methylphenol, 4-	106-44-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0119 U
Methylphenol, 4-	106-44-5	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0124 U
Methylphenol, 4-	106-44-5	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0121 U
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0125 U
Methylphenol, 4-	106-44-5	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0126 U
Methylphenol, 4-	106-44-5	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0121 U
Methylphenol, 4-	106-44-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0117 U
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0125 U
Methylphenol, 4-	106-44-5	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0124 U
Methylphenol, 4-	106-44-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01265 UU
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0125 U
Methylphenol, 4-	106-44-5	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0122 U
Methylphenol, 4-	106-44-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0117 U
Methylphenol, 4-	106-44-5	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0126 U
Methylphenol, 4-	106-44-5	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0118 U
Methylphenol, 4-	106-44-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0119 U
Methylphenol, 4-	106-44-5	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0122 U
Methylphenol, 4-	106-44-5	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0116 UU
Naphthalene	91-20-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Naphthalene	91-20-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Naphthalene	91-20-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Naphthalene	91-20-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Naphthalene	91-20-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00951 U
Naphthalene	91-20-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00951 U
Naphthalene	91-20-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00885 U
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00949 U
Naphthalene	91-20-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.009465 UU
Naphthalene	91-20-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00936 U
Naphthalene	91-20-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00903 U
Naphthalene	91-20-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00941 U
Naphthalene	91-20-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0092 U
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0095 U
Naphthalene	91-20-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00957 U
Naphthalene	91-20-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00923 U
Naphthalene	91-20-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00888 U
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0095 U
Naphthalene	91-20-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00941 U
Naphthalene	91-20-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0096 UU
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0095 U
Naphthalene	91-20-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00927 U
Naphthalene	91-20-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00887 U
Naphthalene	91-20-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00958 U
Naphthalene	91-20-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00899 U
Naphthalene	91-20-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00904 U
Naphthalene	91-20-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00931 U
Naphthalene	91-20-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00883 UU
Nickel	7440-02-0	7.3	mg/kg	4.4		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	4.4

Nickel	7440-02-0	6.1	mg/kg	5.3		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	5.3
Nickel	7440-02-0	6.5	mg/kg	4.4		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	4.4
Nickel	7440-02-0	9	mg/kg	5.4		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	5.4
Nickel	7440-02-0	0.132	mg/kg	0.264	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.132 U
Nickel	7440-02-0	14.2	mg/kg	0.243		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.122
Nickel	7440-02-0	18	mg/kg	0.252		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.126
Nickel	7440-02-0	0.1265	mg/kg	0.253	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.126 U
Nickel	7440-02-0	4.31	mg/kg	0.26	JJ	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.13
Nickel	7440-02-0	15	mg/kg	0.285		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.143
Nickel	7440-02-0	0.1205	mg/kg	0.241	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.121 U
Nickel	7440-02-0	12.9	mg/kg	0.276		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.138
Nickel	7440-02-0	15.2	mg/kg	0.277		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.139
Nickel	7440-02-0	0.1405	mg/kg	0.281	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.141 U
Nickel	7440-02-0	0.138	mg/kg	0.276	U	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.138 U
Nickel	7440-02-0	18.5	mg/kg	0.266		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.133
Nickel	7440-02-0	0.1415	mg/kg	0.283	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.142 U
Nickel	7440-02-0	2.23	mg/kg	0.28		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.14
Nickel	7440-02-0	20.7	mg/kg	0.284		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.142
Nickel	7440-02-0	0.14475	mg/kg	0.2895	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.1445 UU
Nickel	7440-02-0	0.1455	mg/kg	0.291	U	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.146 U
Nickel	7440-02-0	17.7	mg/kg	0.281		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.14
Nickel	7440-02-0	0.126	mg/kg	0.252	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.126 U
Nickel	7440-02-0	1.85	mg/kg	0.315		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.157
Nickel	7440-02-0	14.8	mg/kg	0.249		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.124
Nickel	7440-02-0	0.1445	mg/kg	0.289	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.145 U
Nickel	7440-02-0	0.136	mg/kg	0.272	U	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.136 U
Nickel	7440-02-0	10.56	mg/kg	0.2445		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.1225
Nitroaniline, 2-	88-74-4	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9 U
Nitroaniline, 2-	88-74-4	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87 U
Nitroaniline, 2-	88-74-4	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1 U
Nitroaniline, 2-	88-74-4	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89 U
Nitroaniline, 2-	88-74-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0173 U
Nitroaniline, 2-	88-74-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0173 U
Nitroaniline, 2-	88-74-4	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0161 U
Nitroaniline, 2-	88-74-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0173 U
Nitroaniline, 2-	88-74-4	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01725 UU
Nitroaniline, 2-	88-74-4	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0171 U
Nitroaniline, 2-	88-74-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0165 U
Nitroaniline, 2-	88-74-4	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0171 U
Nitroaniline, 2-	88-74-4	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0168 U
Nitroaniline, 2-	88-74-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0173 U
Nitroaniline, 2-	88-74-4	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0175 U
Nitroaniline, 2-	88-74-4	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0168 U
Nitroaniline, 2-	88-74-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0162 U
Nitroaniline, 2-	88-74-4	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0173 U
Nitroaniline, 2-	88-74-4	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0172 U
Nitroaniline, 2-	88-74-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0175 UU
Nitroaniline, 2-	88-74-4	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0173 U
Nitroaniline, 2-	88-74-4	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0169 U
Nitroaniline, 2-	88-74-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0162 U
Nitroaniline, 2-	88-74-4	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0175 U
Nitroaniline, 2-	88-74-4	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0164 U
Nitroaniline, 2-	88-74-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0165 U
Nitroaniline, 2-	88-74-4	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.017 U
Nitroaniline, 2-	88-74-4	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0161 UU
Nitroaniline, 3-	99-09-2	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9 U
Nitroaniline, 3-	99-09-2	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87 U
Nitroaniline, 3-	99-09-2	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1 U

Nitroaniline, 3-	99-09-2	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89 U
Nitroaniline, 3-	99-09-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0136 U
Nitroaniline, 3-	99-09-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0136 U
Nitroaniline, 3-	99-09-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0127 U
Nitroaniline, 3-	99-09-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0136 U
Nitroaniline, 3-	99-09-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01355 UU
Nitroaniline, 3-	99-09-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0134 U
Nitroaniline, 3-	99-09-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0129 U
Nitroaniline, 3-	99-09-2	0.706	mg/kg	0.396		WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0135
Nitroaniline, 3-	99-09-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0132 U
Nitroaniline, 3-	99-09-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0136 U
Nitroaniline, 3-	99-09-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0137 U
Nitroaniline, 3-	99-09-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0132 U
Nitroaniline, 3-	99-09-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0127 U
Nitroaniline, 3-	99-09-2	0.183	mg/kg	0.4	J	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0136 J
Nitroaniline, 3-	99-09-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0135 U
Nitroaniline, 3-	99-09-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01375 UU
Nitroaniline, 3-	99-09-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0136 U
Nitroaniline, 3-	99-09-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0133 U
Nitroaniline, 3-	99-09-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0127 U
Nitroaniline, 3-	99-09-2	0.0534	mg/kg	0.404	J	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0137 J
Nitroaniline, 3-	99-09-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0129 U
Nitroaniline, 3-	99-09-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0129 U
Nitroaniline, 3-	99-09-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0133 U
Nitroaniline, 3-	99-09-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0126 UU
Nitroaniline, 4-	100-01-6	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9 U
Nitroaniline, 4-	100-01-6	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87 U
Nitroaniline, 4-	100-01-6	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1 U
Nitroaniline, 4-	100-01-6	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89 U
Nitroaniline, 4-	100-01-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.142 U
Nitroaniline, 4-	100-01-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.142 U
Nitroaniline, 4-	100-01-6	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.132 U
Nitroaniline, 4-	100-01-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.142 U
Nitroaniline, 4-	100-01-6	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.1415 UU
Nitroaniline, 4-	100-01-6	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.14 U
Nitroaniline, 4-	100-01-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.135 U
Nitroaniline, 4-	100-01-6	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.14 U
Nitroaniline, 4-	100-01-6	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.137 U
Nitroaniline, 4-	100-01-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.142 U
Nitroaniline, 4-	100-01-6	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.143 U
Nitroaniline, 4-	100-01-6	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.138 U
Nitroaniline, 4-	100-01-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.133 U
Nitroaniline, 4-	100-01-6	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.142 U
Nitroaniline, 4-	100-01-6	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.141 U
Nitroaniline, 4-	100-01-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.1435 UU
Nitroaniline, 4-	100-01-6	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.142 U
Nitroaniline, 4-	100-01-6	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.138 U
Nitroaniline, 4-	100-01-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.133 U
Nitroaniline, 4-	100-01-6	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.143 U
Nitroaniline, 4-	100-01-6	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.134 U
Nitroaniline, 4-	100-01-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.135 U
Nitroaniline, 4-	100-01-6	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.139 U
Nitroaniline, 4-	100-01-6	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.132 UU
Nitrobenzene	98-95-3	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Nitrobenzene	98-95-3	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Nitrobenzene	98-95-3	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Nitrobenzene	98-95-3	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Nitrobenzene	98-95-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0131 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrobenzene	98-95-3	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0131 U
Nitrobenzene	98-95-3	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0122 U
Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0131 U
Nitrobenzene	98-95-3	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01305 UU
Nitrobenzene	98-95-3	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0129 U
Nitrobenzene	98-95-3	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0125 U
Nitrobenzene	98-95-3	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.013 U
Nitrobenzene	98-95-3	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0127 U
Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0131 U
Nitrobenzene	98-95-3	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0132 U
Nitrobenzene	98-95-3	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0127 U
Nitrobenzene	98-95-3	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0122 U
Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0131 U
Nitrobenzene	98-95-3	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.013 U
Nitrobenzene	98-95-3	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01325 UU
Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0131 U
Nitrobenzene	98-95-3	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0128 U
Nitrobenzene	98-95-3	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0122 U
Nitrobenzene	98-95-3	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0132 U
Nitrobenzene	98-95-3	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0124 U
Nitrobenzene	98-95-3	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0125 U
Nitrobenzene	98-95-3	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0128 U
Nitrobenzene	98-95-3	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0122 UU
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrobenzene - exp	98-95-3	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrobenzene - exp	98-95-3	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrobenzene - exp	98-95-3	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrobenzene - exp	98-95-3	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrobenzene - exp	98-95-3	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Nitrobenzene - exp	98-95-3	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Nitrobenzene - exp	98-95-3	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Nitrobenzene - exp	98-95-3	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Nitrobenzene - exp	98-95-3	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
Nitrobenzene - exp	98-95-3	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Nitrobenzene - exp	98-95-3	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Nitrobenzene - exp	98-95-3	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 U
Nitrobenzene - exp	98-95-3	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Nitrobenzene - exp	98-95-3	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
Nitrobenzene - exp	98-95-3	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14 U
Nitrobenzene - exp	98-95-3	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Nitrobenzene - exp	98-95-3	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Nitrobenzene - exp	98-95-3	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
Nitrobenzene - exp	98-95-3	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Nitrobenzene - exp	98-95-3	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Nitrobenzene - exp	98-95-3	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Nitrobenzene - exp	98-95-3	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Nitrobenzene - exp	98-95-3	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Nitrobenzene - exp	98-95-3	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Nitrobenzene - exp	98-95-3	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Nitrobenzene - exp	98-95-3	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Nitrobenzene - exp	98-95-3	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrobenzene - exp	98-95-3	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Nitrophenol, 2-	88-75-5	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Nitrophenol, 2-	88-75-5	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Nitrophenol, 2-	88-75-5	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Nitrophenol, 2-	88-75-5	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Nitrophenol, 2-	88-75-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0142 U
Nitrophenol, 2-	88-75-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0142 U
Nitrophenol, 2-	88-75-5	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0132 U
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0142 U
Nitrophenol, 2-	88-75-5	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01415 UU
Nitrophenol, 2-	88-75-5	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.014 U
Nitrophenol, 2-	88-75-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0135 U
Nitrophenol, 2-	88-75-5	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.014 U
Nitrophenol, 2-	88-75-5	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0137 U
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0142 U
Nitrophenol, 2-	88-75-5	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0143 U
Nitrophenol, 2-	88-75-5	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0138 U
Nitrophenol, 2-	88-75-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0133 U
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0142 U
Nitrophenol, 2-	88-75-5	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0141 U
Nitrophenol, 2-	88-75-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01435 UU
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0142 U
Nitrophenol, 2-	88-75-5	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0138 U
Nitrophenol, 2-	88-75-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0133 U
Nitrophenol, 2-	88-75-5	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0143 U
Nitrophenol, 2-	88-75-5	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0134 U
Nitrophenol, 2-	88-75-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0135 U
Nitrophenol, 2-	88-75-5	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0139 U
Nitrophenol, 2-	88-75-5	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0132 UU
Nitrophenol, 4-	100-02-7	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9 U
Nitrophenol, 4-	100-02-7	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87 U
Nitrophenol, 4-	100-02-7	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1 U
Nitrophenol, 4-	100-02-7	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89 U
Nitrophenol, 4-	100-02-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0325 U
Nitrophenol, 4-	100-02-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0325 U
Nitrophenol, 4-	100-02-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0302 U
Nitrophenol, 4-	100-02-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0324 U
Nitrophenol, 4-	100-02-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03235 UU
Nitrophenol, 4-	100-02-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.032 U
Nitrophenol, 4-	100-02-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0309 U
Nitrophenol, 4-	100-02-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0321 U
Nitrophenol, 4-	100-02-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0314 U
Nitrophenol, 4-	100-02-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0325 U
Nitrophenol, 4-	100-02-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0327 U
Nitrophenol, 4-	100-02-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0315 U
Nitrophenol, 4-	100-02-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0303 U
Nitrophenol, 4-	100-02-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0325 U
Nitrophenol, 4-	100-02-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0322 U
Nitrophenol, 4-	100-02-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0328 UU
Nitrophenol, 4-	100-02-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0325 U
Nitrophenol, 4-	100-02-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0317 U
Nitrophenol, 4-	100-02-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0303 U
Nitrophenol, 4-	100-02-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0327 U
Nitrophenol, 4-	100-02-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0307 U
Nitrophenol, 4-	100-02-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0309 U
Nitrophenol, 4-	100-02-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0318 U
Nitrophenol, 4-	100-02-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0302 UU
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U

Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 2-	88-72-2	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 2-	88-72-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 2-	88-72-2	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 2-	88-72-2	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 2-	88-72-2	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 2-	88-72-2	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Nitrotoluene, 2-	88-72-2	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149	U
Nitrotoluene, 2-	88-72-2	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137	U
Nitrotoluene, 2-	88-72-2	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Nitrotoluene, 2-	88-72-2	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405	UU
Nitrotoluene, 2-	88-72-2	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143	U
Nitrotoluene, 2-	88-72-2	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Nitrotoluene, 2-	88-72-2	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148	U
Nitrotoluene, 2-	88-72-2	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149	U
Nitrotoluene, 2-	88-72-2	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Nitrotoluene, 2-	88-72-2	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14	U
Nitrotoluene, 2-	88-72-2	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152	U
Nitrotoluene, 2-	88-72-2	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157	U
Nitrotoluene, 2-	88-72-2	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153	U
Nitrotoluene, 2-	88-72-2	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145	U
Nitrotoluene, 2-	88-72-2	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425	UU
Nitrotoluene, 2-	88-72-2	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138	U
Nitrotoluene, 2-	88-72-2	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138	U
Nitrotoluene, 2-	88-72-2	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142	U
Nitrotoluene, 2-	88-72-2	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159	U
Nitrotoluene, 2-	88-72-2	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146	U
Nitrotoluene, 2-	88-72-2	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147	U
Nitrotoluene, 2-	88-72-2	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155	U
Nitrotoluene, 2-	88-72-2	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445	UU
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Nitrotoluene, 3-	99-08-1	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 3-	99-08-1	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 3-	99-08-1	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 3-	99-08-1	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		U
Nitrotoluene, 3-	99-08-1	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155	U
Nitrotoluene, 3-	99-08-1	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149	U
Nitrotoluene, 3-	99-08-1	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137	U
Nitrotoluene, 3-	99-08-1	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138	U
Nitrotoluene, 3-	99-08-1	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405	UU
Nitrotoluene, 3-	99-08-1	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143	U
Nitrotoluene, 3-	99-08-1	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144	U
Nitrotoluene, 3-	99-08-1	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148	U
Nitrotoluene, 3-	99-08-1	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149	U
Nitrotoluene, 3-	99-08-1	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159	U
Nitrotoluene, 3-	99-08-1	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14	U

Nitrotoluene, 3-	99-08-1	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Nitrotoluene, 3-	99-08-1	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Nitrotoluene, 3-	99-08-1	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
Nitrotoluene, 3-	99-08-1	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Nitrotoluene, 3-	99-08-1	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Nitrotoluene, 3-	99-08-1	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Nitrotoluene, 3-	99-08-1	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Nitrotoluene, 3-	99-08-1	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Nitrotoluene, 3-	99-08-1	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Nitrotoluene, 3-	99-08-1	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Nitrotoluene, 3-	99-08-1	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Nitrotoluene, 3-	99-08-1	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Nitrotoluene, 3-	99-08-1	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Nitrotoluene, 4-	99-99-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 4-	99-99-0	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 4-	99-99-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 4-	99-99-0	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Nitrotoluene, 4-	99-99-0	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Nitrotoluene, 4-	99-99-0	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Nitrotoluene, 4-	99-99-0	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Nitrotoluene, 4-	99-99-0	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Nitrotoluene, 4-	99-99-0	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
Nitrotoluene, 4-	99-99-0	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Nitrotoluene, 4-	99-99-0	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Nitrotoluene, 4-	99-99-0	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 U
Nitrotoluene, 4-	99-99-0	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Nitrotoluene, 4-	99-99-0	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
Nitrotoluene, 4-	99-99-0	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14 U
Nitrotoluene, 4-	99-99-0	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Nitrotoluene, 4-	99-99-0	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Nitrotoluene, 4-	99-99-0	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
Nitrotoluene, 4-	99-99-0	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Nitrotoluene, 4-	99-99-0	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Nitrotoluene, 4-	99-99-0	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Nitrotoluene, 4-	99-99-0	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Nitrotoluene, 4-	99-99-0	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Nitrotoluene, 4-	99-99-0	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Nitrotoluene, 4-	99-99-0	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Nitrotoluene, 4-	99-99-0	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Nitrotoluene, 4-	99-99-0	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Nitrotoluene, 4-	99-99-0	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
n-Nitrosodimethylamine	62-75-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.012 U
n-Nitrosodimethylamine	62-75-9	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.012 U
n-Nitrosodimethylamine	62-75-9	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0112 U
n-Nitrosodimethylamine	62-75-9	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.012 U
n-Nitrosodimethylamine	62-75-9	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01195 UU
n-Nitrosodimethylamine	62-75-9	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0118 U
n-Nitrosodimethylamine	62-75-9	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0114 U
n-Nitrosodimethylamine	62-75-9	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0119 U
n-Nitrosodimethylamine	62-75-9	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0116 U

n-Nitrosodimethylamine	62-75-9	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.012 U
n-Nitrosodimethylamine	62-75-9	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0121 U
n-Nitrosodimethylamine	62-75-9	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0117 U
n-Nitrosodimethylamine	62-75-9	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0112 U
n-Nitrosodimethylamine	62-75-9	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.012 U
n-Nitrosodimethylamine	62-75-9	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0119 U
n-Nitrosodimethylamine	62-75-9	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01215 UU
n-Nitrosodimethylamine	62-75-9	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.012 U
n-Nitrosodimethylamine	62-75-9	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0117 U
n-Nitrosodimethylamine	62-75-9	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0112 U
n-Nitrosodimethylamine	62-75-9	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0121 U
n-Nitrosodimethylamine	62-75-9	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0114 U
n-Nitrosodimethylamine	62-75-9	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0114 U
n-Nitrosodimethylamine	62-75-9	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0118 U
n-Nitrosodimethylamine	62-75-9	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0112 UU
n-Nitroso-di-n-propylamine	621-64-7	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
n-Nitroso-di-n-propylamine	621-64-7	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
n-Nitroso-di-n-propylamine	621-64-7	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
n-Nitroso-di-n-propylamine	621-64-7	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
n-Nitroso-di-n-propylamine	621-64-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0143 U
n-Nitroso-di-n-propylamine	621-64-7	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0143 U
n-Nitroso-di-n-propylamine	621-64-7	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0133 U
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0143 U
n-Nitroso-di-n-propylamine	621-64-7	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.01425 UU
n-Nitroso-di-n-propylamine	621-64-7	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0141 U
n-Nitroso-di-n-propylamine	621-64-7	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0136 U
n-Nitroso-di-n-propylamine	621-64-7	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0142 U
n-Nitroso-di-n-propylamine	621-64-7	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139 U
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0143 U
n-Nitroso-di-n-propylamine	621-64-7	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0144 U
n-Nitroso-di-n-propylamine	621-64-7	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0139 U
n-Nitroso-di-n-propylamine	621-64-7	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0134 U
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0143 U
n-Nitroso-di-n-propylamine	621-64-7	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0142 U
n-Nitroso-di-n-propylamine	621-64-7	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01445 UU
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0143 U
n-Nitroso-di-n-propylamine	621-64-7	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.014 U
n-Nitroso-di-n-propylamine	621-64-7	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0134 U
n-Nitroso-di-n-propylamine	621-64-7	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0144 U
n-Nitroso-di-n-propylamine	621-64-7	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0135 U
n-Nitroso-di-n-propylamine	621-64-7	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0136 U
n-Nitroso-di-n-propylamine	621-64-7	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.014 U
n-Nitroso-di-n-propylamine	621-64-7	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0133 UU
n-Nitrosodiphenylamine	86-30-6	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
n-Nitrosodiphenylamine	86-30-6	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
n-Nitrosodiphenylamine	86-30-6	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
n-Nitrosodiphenylamine	86-30-6	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
n-Nitrosodiphenylamine	86-30-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00566 U
n-Nitrosodiphenylamine	86-30-6	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00566 U
n-Nitrosodiphenylamine	86-30-6	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00526 U
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00565 U
n-Nitrosodiphenylamine	86-30-6	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00563 UU
n-Nitrosodiphenylamine	86-30-6	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00557 U
n-Nitrosodiphenylamine	86-30-6	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00537 U
n-Nitrosodiphenylamine	86-30-6	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0056 U
n-Nitrosodiphenylamine	86-30-6	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00547 U
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00565 U
n-Nitrosodiphenylamine	86-30-6	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0057 U

n-Nitrosodiphenylamine	86-30-6	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00549	U
n-Nitrosodiphenylamine	86-30-6	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00528	U
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00565	U
n-Nitrosodiphenylamine	86-30-6	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0056	U
n-Nitrosodiphenylamine	86-30-6	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.005705	UU
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00565	U
n-Nitrosodiphenylamine	86-30-6	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00552	U
n-Nitrosodiphenylamine	86-30-6	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00528	U
n-Nitrosodiphenylamine	86-30-6	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0057	U
n-Nitrosodiphenylamine	86-30-6	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00535	U
n-Nitrosodiphenylamine	86-30-6	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00538	U
n-Nitrosodiphenylamine	86-30-6	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00554	U
n-Nitrosodiphenylamine	86-30-6	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.005255	UU
Pentachlorophenol	87-86-5	0.45	mg/kg	0.9	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.9	U
Pentachlorophenol	87-86-5	0.435	mg/kg	0.87	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.87	U
Pentachlorophenol	87-86-5	0.55	mg/kg	1.1	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	1.1	U
Pentachlorophenol	87-86-5	0.445	mg/kg	0.89	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.89	U
Pentachlorophenol	87-86-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.036	U
Pentachlorophenol	87-86-5	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.036	U
Pentachlorophenol	87-86-5	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0335	U
Pentachlorophenol	87-86-5	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0359	U
Pentachlorophenol	87-86-5	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.03585	UU
Pentachlorophenol	87-86-5	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0354	U
Pentachlorophenol	87-86-5	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0342	U
Pentachlorophenol	87-86-5	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0356	U
Pentachlorophenol	87-86-5	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0348	U
Pentachlorophenol	87-86-5	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0359	U
Pentachlorophenol	87-86-5	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0362	U
Pentachlorophenol	87-86-5	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0349	U
Pentachlorophenol	87-86-5	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0336	U
Pentachlorophenol	87-86-5	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.036	U
Pentachlorophenol	87-86-5	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0356	U
Pentachlorophenol	87-86-5	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03635	UU
Pentachlorophenol	87-86-5	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0359	U
Pentachlorophenol	87-86-5	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0351	U
Pentachlorophenol	87-86-5	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0336	U
Pentachlorophenol	87-86-5	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0363	U
Pentachlorophenol	87-86-5	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.034	U
Pentachlorophenol	87-86-5	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0342	U
Pentachlorophenol	87-86-5	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0352	U
Pentachlorophenol	87-86-5	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.0334	UU
Phenanthrene	85-01-8	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Phenanthrene	85-01-8	0.94	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	
Phenanthrene	85-01-8	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Phenanthrene	85-01-8	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Phenanthrene	85-01-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00975	U
Phenanthrene	85-01-8	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00975	U
Phenanthrene	85-01-8	0.0631	mg/kg	0.373	J	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00907	J
Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00973	U
Phenanthrene	85-01-8	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.009705	UU
Phenanthrene	85-01-8	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0096	U
Phenanthrene	85-01-8	0.0579	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00926	J
Phenanthrene	85-01-8	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00964	U
Phenanthrene	85-01-8	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00943	U
Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00974	U
Phenanthrene	85-01-8	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00982	U
Phenanthrene	85-01-8	0.0424	mg/kg	0.389	J	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00946	J
Phenanthrene	85-01-8	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0091	U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00974 U
Phenanthrene	85-01-8	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00965 U
Phenanthrene	85-01-8	0.11925	mg/kg	0.4045	JU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00984 JU
Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00974 U
Phenanthrene	85-01-8	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00951 U
Phenanthrene	85-01-8	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0091 U
Phenanthrene	85-01-8	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00982 U
Phenanthrene	85-01-8	0.0527	mg/kg	0.379	J	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00922 J
Phenanthrene	85-01-8	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00927 U
Phenanthrene	85-01-8	0.0577	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00954 J
Phenanthrene	85-01-8	0.04425	mg/kg	0.3725	JJ	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.009055 JJ
Phenol	108-95-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Phenol	108-95-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Phenol	108-95-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Phenol	108-95-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Phenol	108-95-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00482 U
Phenol	108-95-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00481 U
Phenol	108-95-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00448 U
Phenol	108-95-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00481 U
Phenol	108-95-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.004795 UU
Phenol	108-95-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00474 U
Phenol	108-95-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00457 U
Phenol	108-95-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00476 U
Phenol	108-95-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00466 U
Phenol	108-95-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00481 U
Phenol	108-95-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00485 U
Phenol	108-95-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00467 U
Phenol	108-95-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00449 U
Phenol	108-95-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00481 U
Phenol	108-95-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00476 U
Phenol	108-95-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00486 UU
Phenol	108-95-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00481 U
Phenol	108-95-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00469 U
Phenol	108-95-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00449 U
Phenol	108-95-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00485 U
Phenol	108-95-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00455 U
Phenol	108-95-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00458 U
Phenol	108-95-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00471 U
Phenol	108-95-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.00447 UU
Potassium	7440-09-7	273	mg/kg	546	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546 U
Potassium	7440-09-7	331.5	mg/kg	663	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663 U
Potassium	7440-09-7	277.5	mg/kg	555	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555 U
Potassium	7440-09-7	335	mg/kg	670	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670 U
Potassium	7440-09-7	256	mg/kg	22		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	11
Potassium	7440-09-7	1150	mg/kg	20.3		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	10.1
Potassium	7440-09-7	1470	mg/kg	21		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	10.5
Potassium	7440-09-7	168	mg/kg	21.1		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	10.5
Potassium	7440-09-7	849.5	mg/kg	21.65		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	10.85
Potassium	7440-09-7	1300	mg/kg	23.8		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	11.9
Potassium	7440-09-7	220	mg/kg	20.1		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	10
Potassium	7440-09-7	1480	mg/kg	23		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	11.5
Potassium	7440-09-7	1610	mg/kg	23.1		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	11.5
Potassium	7440-09-7	274	mg/kg	23.5		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	11.7
Potassium	7440-09-7	253	mg/kg	23		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	11.5
Potassium	7440-09-7	1960	mg/kg	22.2		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	11.1
Potassium	7440-09-7	156	mg/kg	23.6		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	11.8
Potassium	7440-09-7	298	mg/kg	23.4		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	11.7
Potassium	7440-09-7	2280	mg/kg	23.7		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	11.8

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Potassium	7440-09-7	175.5	mg/kg	24.1		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	12.1
Potassium	7440-09-7	206	mg/kg	24.3		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	12.1
Potassium	7440-09-7	1820	mg/kg	23.4		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	11.7
Potassium	7440-09-7	165	mg/kg	21		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	10.5
Potassium	7440-09-7	359	mg/kg	26.2		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	13.1
Potassium	7440-09-7	1330	mg/kg	20.7		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	10.4
Potassium	7440-09-7	143	mg/kg	24.1		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	12
Potassium	7440-09-7	222	mg/kg	22.7		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	11.3
Potassium	7440-09-7	973.5	mg/kg	20.4		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	10.19
Pyrene	129-00-0	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Pyrene	129-00-0	0.86	mg/kg	0.36		PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36
Pyrene	129-00-0	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Pyrene	129-00-0	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Pyrene	129-00-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.016 U
Pyrene	129-00-0	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.016 U
Pyrene	129-00-0	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0149 U
Pyrene	129-00-0	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.016 U
Pyrene	129-00-0	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0159 UU
Pyrene	129-00-0	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0158 U
Pyrene	129-00-0	0.158	mg/kg	0.381	J	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0152 J
Pyrene	129-00-0	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0158 U
Pyrene	129-00-0	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0155 U
Pyrene	129-00-0	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.016 U
Pyrene	129-00-0	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0161 U
Pyrene	129-00-0	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0155 U
Pyrene	129-00-0	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0149 U
Pyrene	129-00-0	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.016 U
Pyrene	129-00-0	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0158 U
Pyrene	129-00-0	0.0731	mg/kg	0.4045	JJ	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.01615 JJ
Pyrene	129-00-0	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.016 U
Pyrene	129-00-0	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0156 U
Pyrene	129-00-0	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0149 U
Pyrene	129-00-0	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0161 U
Pyrene	129-00-0	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0151 U
Pyrene	129-00-0	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0152 U
Pyrene	129-00-0	0.214	mg/kg	0.392	J	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0157 J
Pyrene	129-00-0	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.01485 UU
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	5	mg/kg	10	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	10 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.5 U
RDX	121-82-4	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
RDX	121-82-4	0.239	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	
RDX	121-82-4	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
RDX	121-82-4	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
RDX	121-82-4	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
RDX	121-82-4	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
RDX	121-82-4	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
RDX	121-82-4	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
RDX	121-82-4	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
RDX	121-82-4	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
RDX	121-82-4	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
RDX	121-82-4	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 U
RDX	121-82-4	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U

Table E-2
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RDX	121-82-4	0.1585	mg/kg	0.317	U	WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159 U
RDX	121-82-4	0.14	mg/kg	0.28	U	WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14 U
RDX	121-82-4	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
RDX	121-82-4	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
RDX	121-82-4	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
RDX	121-82-4	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
RDX	121-82-4	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
RDX	121-82-4	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
RDX	121-82-4	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
RDX	121-82-4	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
RDX	121-82-4	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
RDX	121-82-4	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
RDX	121-82-4	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
RDX	121-82-4	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
RDX	121-82-4	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Selenium	7782-49-2	0.76	mg/kg	0.56		PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.56
Selenium	7782-49-2	0.275	mg/kg	0.55	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55 U
Selenium	7782-49-2	0.33	mg/kg	0.66	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66 U
Selenium	7782-49-2	0.27	mg/kg	0.54	U	PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.54 U
Selenium	7782-49-2	0.28	mg/kg	0.56	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.56 U
Selenium	7782-49-2	0.275	mg/kg	0.55	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55 U
Selenium	7782-49-2	0.305	mg/kg	0.61	U	PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.61 U
Selenium	7782-49-2	0.6125	mg/kg	0.605	/U	PBOW99-SSW108	PBOW99SSW108PBOW99SSW	METALS	REGFD	10-Jun-99	0.5	1	0.605 U
Selenium	7782-49-2	0.28	mg/kg	0.56	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.56 U
Selenium	7782-49-2	0.4895	mg/kg	0.979	UJ	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.49 U
Selenium	7782-49-2	0.4505	mg/kg	0.901	UJ	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.45 U
Selenium	7782-49-2	0.4585	mg/kg	0.917	UJ	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.458 U
Selenium	7782-49-2	0.4215	mg/kg	0.843	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.422 U
Selenium	7782-49-2	0.4335	mg/kg	0.867	UU	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.4335 UU
Selenium	7782-49-2	0.4795	mg/kg	0.959	UJ	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.479 U
Selenium	7782-49-2	0.402	mg/kg	0.804	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.402 U
Selenium	7782-49-2	0.4605	mg/kg	0.921	U	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.46 U
Selenium	7782-49-2	0.41	mg/kg	0.82	UJ	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.41 U
Selenium	7782-49-2	0.484	mg/kg	0.968	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.484 U
Selenium	7782-49-2	0.4605	mg/kg	0.921	U	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.461 U
Selenium	7782-49-2	0.4765	mg/kg	0.953	UJ	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.476 U
Selenium	7782-49-2	0.472	mg/kg	0.944	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.472 U
Selenium	7782-49-2	0.467	mg/kg	0.934	U	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.467 U
Selenium	7782-49-2	0.4665	mg/kg	0.933	UJ	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.466 U
Selenium	7782-49-2	0.48225	mg/kg	0.9645	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.4825 UU
Selenium	7782-49-2	0.4855	mg/kg	0.971	U	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.486 U
Selenium	7782-49-2	0.45	mg/kg	0.9	UJ	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.45 U
Selenium	7782-49-2	0.4575	mg/kg	0.915	UJ	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.457 U
Selenium	7782-49-2	0.468	mg/kg	0.936	UJ	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.468 U
Selenium	7782-49-2	0.4005	mg/kg	0.801	UJ	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.401 U
Selenium	7782-49-2	0.4815	mg/kg	0.963	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.482 U
Selenium	7782-49-2	0.453	mg/kg	0.906	U	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.453 U
Selenium	7782-49-2	0.42375	mg/kg	0.8475	UJUJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.4235 UU
Silver	7440-22-4	0.28	mg/kg	0.56	U	PBOW99-SSW101	PBOW99SSW101	METALS	REG	10-Jun-99	0.5	1	0.56 U
Silver	7440-22-4	0.275	mg/kg	0.55	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	0.55 U
Silver	7440-22-4	0.33	mg/kg	0.66	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	0.66 U
Silver	7440-22-4	0.27	mg/kg	0.54	U	PBOW99-SSW104	PBOW99SSW104	METALS	REG	10-Jun-99	0.5	1	0.54 U
Silver	7440-22-4	0.28	mg/kg	0.56	U	PBOW99-SSW104	PBOW99SSW105	METALS	REG	10-Jun-99	0.5	1	0.56 U
Silver	7440-22-4	0.275	mg/kg	0.55	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	0.55 U
Silver	7440-22-4	0.305	mg/kg	0.61	U	PBOW99-SSW107	PBOW99SSW107	METALS	REG	10-Jun-99	0.5	1	0.61 U
Silver	7440-22-4	0.3025	mg/kg	0.605	UU	PBOW99-SSW108	PBOW99SSW108PBOW99SSW	METALS	REGFD	10-Jun-99	0.5	1	0.605 UU
Silver	7440-22-4	0.28	mg/kg	0.56	U	PBOW99-SSW109	PBOW99SSW109	METALS	REG	10-Jun-99	0.5	1	0.56 U
Silver	7440-22-4	0.22	mg/kg	0.44	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.22 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Silver	7440-22-4	0.2025	mg/kg	0.405	U	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.203 U
Silver	7440-22-4	0.2105	mg/kg	0.421	U	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.21 U
Silver	7440-22-4	0.211	mg/kg	0.422	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211 U
Silver	7440-22-4	0.21675	mg/kg	0.4335	UU	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165 UU
Silver	7440-22-4	0.238	mg/kg	0.476	U	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.238 U
Silver	7440-22-4	0.201	mg/kg	0.402	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201 U
Silver	7440-22-4	0.23	mg/kg	0.46	U	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23 U
Silver	7440-22-4	0.231	mg/kg	0.462	U	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.231 U
Silver	7440-22-4	0.2345	mg/kg	0.469	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.235 U
Silver	7440-22-4	0.2305	mg/kg	0.461	U	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23 U
Silver	7440-22-4	0.222	mg/kg	0.444	U	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.222 U
Silver	7440-22-4	0.236	mg/kg	0.472	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236 U
Silver	7440-22-4	0.2335	mg/kg	0.467	U	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234 U
Silver	7440-22-4	0.237	mg/kg	0.474	U	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.237 U
Silver	7440-22-4	0.24125	mg/kg	0.4825	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241 UU
Silver	7440-22-4	0.243	mg/kg	0.486	U	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243 U
Silver	7440-22-4	0.234	mg/kg	0.468	U	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.234 U
Silver	7440-22-4	0.2105	mg/kg	0.421	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.21 U
Silver	7440-22-4	0.2625	mg/kg	0.525	U	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.262 U
Silver	7440-22-4	0.2075	mg/kg	0.415	U	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.207 U
Silver	7440-22-4	0.241	mg/kg	0.482	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241 U
Silver	7440-22-4	0.2265	mg/kg	0.453	U	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227 U
Silver	7440-22-4	0.2035	mg/kg	0.407	UU	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.204 UU
Sodium	7440-23-5	273	mg/kg	546	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	546 U
Sodium	7440-23-5	331.5	mg/kg	663	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	663 U
Sodium	7440-23-5	277.5	mg/kg	555	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	555 U
Sodium	7440-23-5	335	mg/kg	670	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	670 U
Sodium	7440-23-5	98.2	mg/kg	8.8		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	4.4
Sodium	7440-23-5	397	mg/kg	8.1		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	4.05
Sodium	7440-23-5	263	mg/kg	8.42		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	4.21
Sodium	7440-23-5	51.6	mg/kg	8.43		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	4.22
Sodium	7440-23-5	142.5	mg/kg	8.67		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	4.335
Sodium	7440-23-5	261	mg/kg	9.51		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	4.76
Sodium	7440-23-5	65.8	mg/kg	8.04		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	4.02
Sodium	7440-23-5	223	mg/kg	9.21		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	4.6
Sodium	7440-23-5	279	mg/kg	9.24		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	4.62
Sodium	7440-23-5	50.1	mg/kg	9.38		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	4.69
Sodium	7440-23-5	90.5	mg/kg	9.21		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	4.61
Sodium	7440-23-5	379	mg/kg	8.88		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	4.44
Sodium	7440-23-5	34.7	mg/kg	9.44		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	4.72
Sodium	7440-23-5	104	mg/kg	9.34		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	4.67
Sodium	7440-23-5	239	mg/kg	9.47		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	4.74
Sodium	7440-23-5	57.5	mg/kg	9.645		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	4.825
Sodium	7440-23-5	90.1	mg/kg	9.71		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	4.86
Sodium	7440-23-5	783	mg/kg	9.35		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	4.68
Sodium	7440-23-5	50.7	mg/kg	8.42		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	4.21
Sodium	7440-23-5	202	mg/kg	10.5		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	5.25
Sodium	7440-23-5	313	mg/kg	8.3		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	4.15
Sodium	7440-23-5	33.3	mg/kg	9.63		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	4.82
Sodium	7440-23-5	62	mg/kg	9.06		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	4.53
Sodium	7440-23-5	124	mg/kg	8.14		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	4.07
Styrene	100-42-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Styrene	100-42-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Styrene	100-42-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Tetrachloroethene	127-18-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U

Table E-2
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Tetrachloroethene	127-18-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Tetrachloroethene	127-18-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	6.5	mg/kg	13	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	13 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.65 U
Tetryl	479-45-8	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	U
Tetryl	479-45-8	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	U
Tetryl	479-45-8	0.095	mg/kg	0.19	UJ	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	U
Tetryl	479-45-8	0.095	mg/kg	0.19	U	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	U
Tetryl	479-45-8	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Tetryl	479-45-8	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Tetryl	479-45-8	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Tetryl	479-45-8	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Tetryl	479-45-8	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
Tetryl	479-45-8	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Tetryl	479-45-8	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Tetryl	479-45-8	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 U
Tetryl	479-45-8	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Tetryl	479-45-8	0.587	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159
Tetryl	479-45-8	2.94	mg/kg	0.28		WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14
Tetryl	479-45-8	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Tetryl	479-45-8	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Tetryl	479-45-8	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
Tetryl	479-45-8	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Tetryl	479-45-8	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Tetryl	479-45-8	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Tetryl	479-45-8	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Tetryl	479-45-8	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Tetryl	479-45-8	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Tetryl	479-45-8	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Tetryl	479-45-8	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Tetryl	479-45-8	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Tetryl	479-45-8	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Thallium	7440-28-0	0.55	mg/kg	1.1	U	PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	1.1 U
Thallium	7440-28-0	0.65	mg/kg	1.3	U	PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	1.3 U
Thallium	7440-28-0	0.55	mg/kg	1.1	U	PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	1.1 U
Thallium	7440-28-0	0.65	mg/kg	1.3	U	PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	1.3 U
Thallium	7440-28-0	0.245	mg/kg	0.49	U	WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.245 U
Thallium	7440-28-0	0.373	mg/kg	0.45	J	WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.225 J
Thallium	7440-28-0	0.387	mg/kg	0.458	J	WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.229 J
Thallium	7440-28-0	0.211	mg/kg	0.422	U	WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.211 U
Thallium	7440-28-0	0.24375	mg/kg	0.4335	U/J	WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.2165 UJ
Thallium	7440-28-0	0.41	mg/kg	0.479	J	WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.24 J
Thallium	7440-28-0	0.201	mg/kg	0.402	U	WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.201 U
Thallium	7440-28-0	0.23	mg/kg	0.46	U	WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.23 U
Thallium	7440-28-0	0.317	mg/kg	0.41	J	WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.205 J
Thallium	7440-28-0	0.242	mg/kg	0.484	U	WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.242 U
Thallium	7440-28-0	0.2305	mg/kg	0.461	U	WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.23 U
Thallium	7440-28-0	0.307	mg/kg	0.476	J	WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.238 J
Thallium	7440-28-0	0.236	mg/kg	0.472	U	WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.236 U
Thallium	7440-28-0	0.2335	mg/kg	0.467	U	WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.234 U
Thallium	7440-28-0	0.242	mg/kg	0.466	J	WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.233 J
Thallium	7440-28-0	0.24125	mg/kg	0.4825	UU	WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.241 UU

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Thallium	7440-28-0	0.243	mg/kg	0.486	U	WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.243 U
Thallium	7440-28-0	0.429	mg/kg	0.45	J	WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.225 J
Thallium	7440-28-0	0.2285	mg/kg	0.457	U	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.229 U
Thallium	7440-28-0	0.234	mg/kg	0.468	U	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.234 U
Thallium	7440-28-0	0.414	mg/kg	0.401		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.2
Thallium	7440-28-0	0.241	mg/kg	0.482	U	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.241 U
Thallium	7440-28-0	0.2265	mg/kg	0.453	U	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.227 U
Thallium	7440-28-0	0.3845	mg/kg	0.4235	JJ	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.212 JJ
Toluene	108-88-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Toluene	108-88-3	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Toluene	108-88-3	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichlorobenzene, 1,2,4-	120-82-1	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Trichlorobenzene, 1,2,4-	120-82-1	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Trichlorobenzene, 1,2,4-	120-82-1	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Trichlorobenzene, 1,2,4-	120-82-1	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Trichlorobenzene, 1,2,4-	120-82-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.00987 U
Trichlorobenzene, 1,2,4-	120-82-1	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.00987 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.00919 U
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.00986 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.00983 UU
Trichlorobenzene, 1,2,4-	120-82-1	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00971 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.00937 U
Trichlorobenzene, 1,2,4-	120-82-1	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.00976 U
Trichlorobenzene, 1,2,4-	120-82-1	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00955 U
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.00986 U
Trichlorobenzene, 1,2,4-	120-82-1	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.00994 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00958 U
Trichlorobenzene, 1,2,4-	120-82-1	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.00921 U
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.00986 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.00977 U
Trichlorobenzene, 1,2,4-	120-82-1	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.00996 UU
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.00986 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00962 U
Trichlorobenzene, 1,2,4-	120-82-1	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.00921 U
Trichlorobenzene, 1,2,4-	120-82-1	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.00995 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.00934 U
Trichlorobenzene, 1,2,4-	120-82-1	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.00939 U
Trichlorobenzene, 1,2,4-	120-82-1	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.00966 U
Trichlorobenzene, 1,2,4-	120-82-1	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.009165 UU
Trichloroethane, 1,1,1-	71-55-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichloroethane, 1,1,1-	71-55-6	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Trichloroethane, 1,1,1-	71-55-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichloroethane, 1,1,2-	79-00-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichloroethane, 1,1,2-	79-00-5	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Trichloroethane, 1,1,2-	79-00-5	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichloroethene	79-01-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichloroethene	79-01-6	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066 U
Trichloroethene	79-01-6	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055 U
Trichlorophenol, 2,4,5-	95-95-4	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Trichlorophenol, 2,4,5-	95-95-4	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36 U
Trichlorophenol, 2,4,5-	95-95-4	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44 U
Trichlorophenol, 2,4,5-	95-95-4	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37 U
Trichlorophenol, 2,4,5-	95-95-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0344 U
Trichlorophenol, 2,4,5-	95-95-4	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0344 U
Trichlorophenol, 2,4,5-	95-95-4	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.032 U
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.0344 U
Trichlorophenol, 2,4,5-	95-95-4	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.0343 UU
Trichlorophenol, 2,4,5-	95-95-4	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0339 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trichlorophenol, 2,4,5-	95-95-4	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0327	U
Trichlorophenol, 2,4,5-	95-95-4	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.034	U
Trichlorophenol, 2,4,5-	95-95-4	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0333	U
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.0344	U
Trichlorophenol, 2,4,5-	95-95-4	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0347	U
Trichlorophenol, 2,4,5-	95-95-4	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0334	U
Trichlorophenol, 2,4,5-	95-95-4	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0321	U
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0344	U
Trichlorophenol, 2,4,5-	95-95-4	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0341	U
Trichlorophenol, 2,4,5-	95-95-4	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.03475	UU
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.0344	U
Trichlorophenol, 2,4,5-	95-95-4	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0336	U
Trichlorophenol, 2,4,5-	95-95-4	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0321	U
Trichlorophenol, 2,4,5-	95-95-4	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0347	U
Trichlorophenol, 2,4,5-	95-95-4	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0326	U
Trichlorophenol, 2,4,5-	95-95-4	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0327	U
Trichlorophenol, 2,4,5-	95-95-4	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0337	U
Trichlorophenol, 2,4,5-	95-95-4	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.032	UU
Trichlorophenol, 2,4,6-	88-06-2	0.185	mg/kg	0.37	U	PBOW99-SSW101	PBOW99SSW101	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorophenol, 2,4,6-	88-06-2	0.18	mg/kg	0.36	U	PBOW99-SSW102	PBOW99SSW102	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.36	U
Trichlorophenol, 2,4,6-	88-06-2	0.22	mg/kg	0.44	U	PBOW99-SSW103	PBOW99SSW103	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.44	U
Trichlorophenol, 2,4,6-	88-06-2	0.185	mg/kg	0.37	U	PBOW99-SSW106	PBOW99SSW106	SEMIVOLATILES	REG	10-Jun-99	0.5	1	0.37	U
Trichlorophenol, 2,4,6-	88-06-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0001	SEMIVOLATILES	REG	5-Dec-08	2.6	3.6	0.0271	U
Trichlorophenol, 2,4,6-	88-06-2	0.2005	mg/kg	0.401	U	WWTP1-SB01	WW0002	SEMIVOLATILES	REG	5-Dec-08	5.6	7.6	0.0271	U
Trichlorophenol, 2,4,6-	88-06-2	0.1865	mg/kg	0.373	U	WWTP1-SB01	WW0003	SEMIVOLATILES	REG	5-Dec-08	8	10	0.0252	U
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	WWTP1-SB02	WW0004	SEMIVOLATILES	REG	4-Dec-08	1.6	2.6	0.027	U
Trichlorophenol, 2,4,6-	88-06-2	0.1995	mg/kg	0.399	UU	WWTP1-SB02	WW0005WW0006	SEMIVOLATILES	REGFD	4-Dec-08	5	6.6	0.02695	UU
Trichlorophenol, 2,4,6-	88-06-2	0.197	mg/kg	0.394	U	WWTP1-SB02	WW0007	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0267	U
Trichlorophenol, 2,4,6-	88-06-2	0.1905	mg/kg	0.381	U	WWTP1-SB03	WW0008	SEMIVOLATILES	REG	4-Dec-08	1.2	2.2	0.0257	U
Trichlorophenol, 2,4,6-	88-06-2	0.198	mg/kg	0.396	U	WWTP1-SB03	WW0009	SEMIVOLATILES	REG	4-Dec-08	5	6.2	0.0268	U
Trichlorophenol, 2,4,6-	88-06-2	0.194	mg/kg	0.388	U	WWTP1-SB03	WW0010	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0262	U
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	WWTP1-SB04	WW0011	SEMIVOLATILES	REG	4-Dec-08	1.7	2.7	0.027	U
Trichlorophenol, 2,4,6-	88-06-2	0.202	mg/kg	0.404	U	WWTP1-SB04	WW0012	SEMIVOLATILES	REG	4-Dec-08	5	6.7	0.0273	U
Trichlorophenol, 2,4,6-	88-06-2	0.1945	mg/kg	0.389	U	WWTP1-SB04	WW0013	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0263	U
Trichlorophenol, 2,4,6-	88-06-2	0.187	mg/kg	0.374	U	WWTP1-SB05	WW0014	SEMIVOLATILES	REG	4-Dec-08	2.2	3.2	0.0253	U
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	WWTP1-SB05	WW0015	SEMIVOLATILES	REG	4-Dec-08	5.2	7.2	0.0271	U
Trichlorophenol, 2,4,6-	88-06-2	0.1985	mg/kg	0.397	U	WWTP1-SB05	WW0016	SEMIVOLATILES	REG	4-Dec-08	8	10	0.0268	U
Trichlorophenol, 2,4,6-	88-06-2	0.20225	mg/kg	0.4045	UU	WWTP1-SB06	WW0018WW0017	SEMIVOLATILES	FDREG	3-Dec-08	1.1	2.1	0.0273	UU
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	WWTP1-SB06	WW0019	SEMIVOLATILES	REG	3-Dec-08	5	6.1	0.027	U
Trichlorophenol, 2,4,6-	88-06-2	0.1955	mg/kg	0.391	U	WWTP1-SB06	WW0020	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0264	U
Trichlorophenol, 2,4,6-	88-06-2	0.187	mg/kg	0.374	U	WWTP1-SB07	WW0021	SEMIVOLATILES	REG	3-Dec-08	1	2	0.0253	U
Trichlorophenol, 2,4,6-	88-06-2	0.202	mg/kg	0.404	U	WWTP1-SB07	WW0022	SEMIVOLATILES	REG	3-Dec-08	5	6	0.0273	U
Trichlorophenol, 2,4,6-	88-06-2	0.1895	mg/kg	0.379	U	WWTP1-SB07	WW0023	SEMIVOLATILES	REG	3-Dec-08	8	10	0.0256	U
Trichlorophenol, 2,4,6-	88-06-2	0.1905	mg/kg	0.381	U	WWTP1-SB08	WW0024	SEMIVOLATILES	REG	4-Dec-08	1.8	2.8	0.0258	U
Trichlorophenol, 2,4,6-	88-06-2	0.196	mg/kg	0.392	U	WWTP1-SB08	WW0025	SEMIVOLATILES	REG	4-Dec-08	5	6.8	0.0265	U
Trichlorophenol, 2,4,6-	88-06-2	0.18625	mg/kg	0.3725	UU	WWTP1-SB08	WW0026WW0027	SEMIVOLATILES	REGFD	4-Dec-08	8	10	0.02515	UU
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	2.5	mg/kg	5	U	PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25	U
Trinitrobenzene, 1,3,5-	99-35-4	0.075	mg/kg	0.15	U	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1		U
Trinitrobenzene, 1,3,5-	99-35-4	0.461	mg/kg		J	PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1		
Trinitrobenzene, 1,3,5-	99-35-4	0.159	mg/kg		J	PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1		J
Trinitrobenzene, 1,3,5-	99-35-4	0.116	mg/kg		J	PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1		J

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trinitrobenzene, 1,3,5-	99-35-4	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Trinitrobenzene, 1,3,5-	99-35-4	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Trinitrobenzene, 1,3,5-	99-35-4	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Trinitrobenzene, 1,3,5-	99-35-4	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Trinitrobenzene, 1,3,5-	99-35-4	0.14025	mg/kg	0.2805	UU	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 UU
Trinitrobenzene, 1,3,5-	99-35-4	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Trinitrobenzene, 1,3,5-	99-35-4	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Trinitrobenzene, 1,3,5-	99-35-4	0.148	mg/kg	0.296	U	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 U
Trinitrobenzene, 1,3,5-	99-35-4	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Trinitrobenzene, 1,3,5-	99-35-4	0.836	mg/kg	0.317		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	0.159
Trinitrobenzene, 1,3,5-	99-35-4	2.6	mg/kg	0.28		WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	0.14
Trinitrobenzene, 1,3,5-	99-35-4	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Trinitrobenzene, 1,3,5-	99-35-4	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Trinitrobenzene, 1,3,5-	99-35-4	0.153	mg/kg	0.306	U	WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153 U
Trinitrobenzene, 1,3,5-	99-35-4	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Trinitrobenzene, 1,3,5-	99-35-4	0.14225	mg/kg	0.2845	UU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 UU
Trinitrobenzene, 1,3,5-	99-35-4	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Trinitrobenzene, 1,3,5-	99-35-4	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Trinitrobenzene, 1,3,5-	99-35-4	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Trinitrobenzene, 1,3,5-	99-35-4	0.1585	mg/kg	0.317	UJ	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Trinitrobenzene, 1,3,5-	99-35-4	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Trinitrobenzene, 1,3,5-	99-35-4	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U
Trinitrobenzene, 1,3,5-	99-35-4	0.1555	mg/kg	0.311	U	WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155 U
Trinitrobenzene, 1,3,5-	99-35-4	0.14425	mg/kg	0.2885	UU	WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445 UU
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW101	PBOW99SSW101	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW102	PBOW99SSW102	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW103	PBOW99SSW103	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.66	mg/kg	0.25		PBOW99-SSW104	PBOW99SSW104	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25
Trinitrotoluene, 2,4,6-	118-96-7	130	mg/kg	5		PBOW99-SSW104	PBOW99SSW105	EXPLOSIVES	REG	10-Jun-99	0.5	1	5
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW106	PBOW99SSW106	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SSW107	PBOW99SSW107	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	1.4	mg/kg	0.25		PBOW99-SSW109	PBOW99SSW109	EXPLOSIVES	REG	10-Jun-99	0.5	1	0.25
Trinitrotoluene, 2,4,6-	118-96-7	2.74	mg/kg		J	PBOW99-SSW108	SSW-108-NE	EXPLOSIVES	REG	18-Nov-10	0	1	
Trinitrotoluene, 2,4,6-	118-96-7	49.9	mg/kg			PBOW99-SSW108	SSW-108-NW	EXPLOSIVES	REG	18-Nov-10	0	1	
Trinitrotoluene, 2,4,6-	118-96-7	0.352	mg/kg			PBOW99-SSW108	SSW-108-R	EXPLOSIVES	REG	18-Nov-10	0	1	
Trinitrotoluene, 2,4,6-	118-96-7	6.24	mg/kg			PBOW99-SSW108	SSW-108-S	EXPLOSIVES	REG	18-Nov-10	0	1	
Trinitrotoluene, 2,4,6-	118-96-7	0.1555	mg/kg	0.311	U	WWTP1-SB01	WW0001	EXPLOSIVES	REG	5-Dec-08	2.6	3.6	0.155 U
Trinitrotoluene, 2,4,6-	118-96-7	0.1485	mg/kg	0.297	U	WWTP1-SB01	WW0002	EXPLOSIVES	REG	5-Dec-08	5.6	7.6	0.149 U
Trinitrotoluene, 2,4,6-	118-96-7	0.137	mg/kg	0.274	U	WWTP1-SB01	WW0003	EXPLOSIVES	REG	5-Dec-08	8	10	0.137 U
Trinitrotoluene, 2,4,6-	118-96-7	0.138	mg/kg	0.276	U	WWTP1-SB02	WW0004	EXPLOSIVES	REG	4-Dec-08	1.6	2.6	0.138 U
Trinitrotoluene, 2,4,6-	118-96-7	0.1685	mg/kg	0.2805	JJ	WWTP1-SB02	WW0005WW0006	EXPLOSIVES	REGFD	4-Dec-08	5	6.6	0.1405 JJ
Trinitrotoluene, 2,4,6-	118-96-7	0.143	mg/kg	0.286	U	WWTP1-SB02	WW0007	EXPLOSIVES	REG	4-Dec-08	8	10	0.143 U
Trinitrotoluene, 2,4,6-	118-96-7	0.144	mg/kg	0.288	U	WWTP1-SB03	WW0008	EXPLOSIVES	REG	4-Dec-08	1.2	2.2	0.144 U
Trinitrotoluene, 2,4,6-	118-96-7	0.24	mg/kg	0.296	J	WWTP1-SB03	WW0009	EXPLOSIVES	REG	4-Dec-08	5	6.2	0.148 J
Trinitrotoluene, 2,4,6-	118-96-7	0.1495	mg/kg	0.299	U	WWTP1-SB03	WW0010	EXPLOSIVES	REG	4-Dec-08	8	10	0.149 U
Trinitrotoluene, 2,4,6-	118-96-7	26.9	mg/kg	3.17		WWTP1-SB04	WW0011	EXPLOSIVES	REG	4-Dec-08	1.7	2.7	1.59
Trinitrotoluene, 2,4,6-	118-96-7	181	mg/kg	28		WWTP1-SB04	WW0012	EXPLOSIVES	REG	4-Dec-08	5	6.7	14
Trinitrotoluene, 2,4,6-	118-96-7	0.1515	mg/kg	0.303	U	WWTP1-SB04	WW0013	EXPLOSIVES	REG	4-Dec-08	8	10	0.152 U
Trinitrotoluene, 2,4,6-	118-96-7	0.157	mg/kg	0.314	U	WWTP1-SB05	WW0014	EXPLOSIVES	REG	4-Dec-08	2.2	3.2	0.157 U
Trinitrotoluene, 2,4,6-	118-96-7	3.54	mg/kg	0.306		WWTP1-SB05	WW0015	EXPLOSIVES	REG	4-Dec-08	5.2	7.2	0.153
Trinitrotoluene, 2,4,6-	118-96-7	0.145	mg/kg	0.29	U	WWTP1-SB05	WW0016	EXPLOSIVES	REG	4-Dec-08	8	10	0.145 U
Trinitrotoluene, 2,4,6-	118-96-7	0.1525	mg/kg	0.2845	JU	WWTP1-SB06	WW0018WW0017	EXPLOSIVES	FDREG	3-Dec-08	1.1	2.1	0.1425 JU
Trinitrotoluene, 2,4,6-	118-96-7	0.1375	mg/kg	0.275	U	WWTP1-SB06	WW0019	EXPLOSIVES	REG	3-Dec-08	5	6.1	0.138 U
Trinitrotoluene, 2,4,6-	118-96-7	0.138	mg/kg	0.276	U	WWTP1-SB06	WW0020	EXPLOSIVES	REG	3-Dec-08	8	10	0.138 U
Trinitrotoluene, 2,4,6-	118-96-7	0.142	mg/kg	0.284	U	WWTP1-SB07	WW0021	EXPLOSIVES	REG	3-Dec-08	1	2	0.142 U
Trinitrotoluene, 2,4,6-	118-96-7	0.1585	mg/kg	0.317	U	WWTP1-SB07	WW0022	EXPLOSIVES	REG	3-Dec-08	5	6	0.159 U
Trinitrotoluene, 2,4,6-	118-96-7	0.1455	mg/kg	0.291	U	WWTP1-SB07	WW0023	EXPLOSIVES	REG	3-Dec-08	8	10	0.146 U
Trinitrotoluene, 2,4,6-	118-96-7	0.147	mg/kg	0.294	U	WWTP1-SB08	WW0024	EXPLOSIVES	REG	4-Dec-08	1.8	2.8	0.147 U

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trinitrotoluene, 2,4,6-	118-96-7	0.413	mg/kg	0.311		WWTP1-SB08	WW0025	EXPLOSIVES	REG	4-Dec-08	5	6.8	0.155	
Trinitrotoluene, 2,4,6-	118-96-7	0.3335	mg/kg	0.2885		WWTP1-SB08	WW0026WW0027	EXPLOSIVES	REGFD	4-Dec-08	8	10	0.1445	
Vanadium	7440-62-2	14.6	mg/kg	5.5		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	5.5	
Vanadium	7440-62-2	12.6	mg/kg	6.6		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	6.6	
Vanadium	7440-62-2	13.8	mg/kg	5.5		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	5.5	
Vanadium	7440-62-2	26.5	mg/kg	6.7		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	6.7	
Vanadium	7440-62-2	24.5	mg/kg	0.176		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	0.088	
Vanadium	7440-62-2	20.2	mg/kg	0.162		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	0.081	
Vanadium	7440-62-2	17.8	mg/kg	0.168		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	0.0842	
Vanadium	7440-62-2	40.5	mg/kg	0.169		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	0.0843	
Vanadium	7440-62-2	20.7	mg/kg	0.1735		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	0.0867	
Vanadium	7440-62-2	21.2	mg/kg	0.19		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	0.0951	
Vanadium	7440-62-2	22	mg/kg	0.161		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	0.0804	
Vanadium	7440-62-2	17.7	mg/kg	0.184		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	0.0921	
Vanadium	7440-62-2	21.8	mg/kg	0.185		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	0.0924	
Vanadium	7440-62-2	31.5	mg/kg	0.188		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	0.0938	
Vanadium	7440-62-2	19.7	mg/kg	0.184		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	0.0921	
Vanadium	7440-62-2	22.7	mg/kg	0.178		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	0.0888	
Vanadium	7440-62-2	56.7	mg/kg	0.189		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	0.0944	
Vanadium	7440-62-2	12.4	mg/kg	0.187		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	0.0934	
Vanadium	7440-62-2	25.2	mg/kg	0.189		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	0.0947	
Vanadium	7440-62-2	26.5	mg/kg	0.193		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	0.09645	
Vanadium	7440-62-2	21.1	mg/kg	0.194		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	0.0971	
Vanadium	7440-62-2	23.8	mg/kg	0.187		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	0.0935	
Vanadium	7440-62-2	36.4	mg/kg	0.168		WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	0.0842	
Vanadium	7440-62-2	12.3	mg/kg	0.21		WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	0.105	
Vanadium	7440-62-2	18.1	mg/kg	0.166		WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	0.083	
Vanadium	7440-62-2	26.7	mg/kg	0.193		WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	0.0963	
Vanadium	7440-62-2	25.6	mg/kg	0.181		WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	0.0906	
Vanadium	7440-62-2	16.2	mg/kg	0.163		WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	0.0814	
Vinyl chloride	75-01-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Vinyl chloride	75-01-4	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Vinyl chloride	75-01-4	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Xylenes, total	1330-20-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW102	PBOW99SSW102	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Xylenes, total	1330-20-7	0.0033	mg/kg	0.0066	U	PBOW99-SSW103	PBOW99SSW103	VOLATILES	REG	10-Jun-99	0.5	1	0.0066	U
Xylenes, total	1330-20-7	0.00275	mg/kg	0.0055	U	PBOW99-SSW106	PBOW99SSW106	VOLATILES	REG	10-Jun-99	0.5	1	0.0055	U
Zinc	7440-66-6	59.4	mg/kg	2.2		PBOW99-SSW102	PBOW99SSW102	METALS	REG	10-Jun-99	0.5	1	2.2	MBD
Zinc	7440-66-6	25.5	mg/kg	2.7		PBOW99-SSW103	PBOW99SSW103	METALS	REG	10-Jun-99	0.5	1	2.7	MBD
Zinc	7440-66-6	31.4	mg/kg	2.2		PBOW99-SSW106	PBOW99SSW106	METALS	REG	10-Jun-99	0.5	1	2.2	MBD
Zinc	7440-66-6	50.7	mg/kg	2.7		PBOW99-SSW108	PBOW99SSW110	METALS	FD	10-Jun-99	0.5	1	2.7	MBD
Zinc	7440-66-6	23.9	mg/kg	2.2		WWTP1-SB01	WW0001	METALS	REG	5-Dec-08	2.6	3.6	1.1	
Zinc	7440-66-6	53.2	mg/kg	2.03		WWTP1-SB01	WW0002	METALS	REG	5-Dec-08	5.6	7.6	1.01	
Zinc	7440-66-6	79.1	mg/kg	2.1		WWTP1-SB01	WW0003	METALS	REG	5-Dec-08	8	10	1.05	
Zinc	7440-66-6	30.4	mg/kg	2.11		WWTP1-SB02	WW0004	METALS	REG	4-Dec-08	1.6	2.6	1.05	
Zinc	7440-66-6	35.95	mg/kg	2.165		WWTP1-SB02	WW0005WW0006	METALS	REGFD	4-Dec-08	5	6.6	1.085	
Zinc	7440-66-6	60.2	mg/kg	2.38		WWTP1-SB02	WW0007	METALS	REG	4-Dec-08	8	10	1.19	
Zinc	7440-66-6	25.1	mg/kg	2.01		WWTP1-SB03	WW0008	METALS	REG	4-Dec-08	1.2	2.2	1	
Zinc	7440-66-6	56.3	mg/kg	2.3		WWTP1-SB03	WW0009	METALS	REG	4-Dec-08	5	6.2	1.15	
Zinc	7440-66-6	60.6	mg/kg	2.31		WWTP1-SB03	WW0010	METALS	REG	4-Dec-08	8	10	1.15	
Zinc	7440-66-6	27.1	mg/kg	2.35		WWTP1-SB04	WW0011	METALS	REG	4-Dec-08	1.7	2.7	1.17	
Zinc	7440-66-6	17.6	mg/kg	2.3		WWTP1-SB04	WW0012	METALS	REG	4-Dec-08	5	6.7	1.15	
Zinc	7440-66-6	67.7	mg/kg	2.22		WWTP1-SB04	WW0013	METALS	REG	4-Dec-08	8	10	1.11	
Zinc	7440-66-6	30.8	mg/kg	2.36		WWTP1-SB05	WW0014	METALS	REG	4-Dec-08	2.2	3.2	1.18	
Zinc	7440-66-6	15.6	mg/kg	2.34		WWTP1-SB05	WW0015	METALS	REG	4-Dec-08	5.2	7.2	1.17	
Zinc	7440-66-6	72.8	mg/kg	2.37		WWTP1-SB05	WW0016	METALS	REG	4-Dec-08	8	10	1.18	
Zinc	7440-66-6	40.25	mg/kg	2.41		WWTP1-SB06	WW0018WW0017	METALS	FDREG	3-Dec-08	1.1	2.1	1.21	
Zinc	7440-66-6	19.1	mg/kg	2.43		WWTP1-SB06	WW0019	METALS	REG	3-Dec-08	5	6.1	1.21	
Zinc	7440-66-6	64.4	mg/kg	2.34		WWTP1-SB06	WW0020	METALS	REG	3-Dec-08	8	10	1.17	

Table E-2
Total Soil Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Zinc	7440-66-6	25	mg/kg	2.1	WWTP1-SB07	WW0021	METALS	REG	3-Dec-08	1	2	1.05
Zinc	7440-66-6	17.6	mg/kg	2.62	WWTP1-SB07	WW0022	METALS	REG	3-Dec-08	5	6	1.31
Zinc	7440-66-6	85.7	mg/kg	2.07	WWTP1-SB07	WW0023	METALS	REG	3-Dec-08	8	10	1.04
Zinc	7440-66-6	38.8	mg/kg	2.41	WWTP1-SB08	WW0024	METALS	REG	4-Dec-08	1.8	2.8	1.2
Zinc	7440-66-6	38.8	mg/kg	2.27	WWTP1-SB08	WW0025	METALS	REG	4-Dec-08	5	6.8	1.13
Zinc	7440-66-6	53.95	mg/kg	2.04	WWTP1-SB08	WW0026WW0027	METALS	REGFD	4-Dec-08	8	10	1.019

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

PARAMETER	CASNUM	RES	UNIT	DETLIMIT	VQUAL	LOCATION_CODE	SAMPLE_NO	USER_TEST_PANEL	PURPOSE	SAMPLE_DATE	METH_DET_LIM	FILTERED	LAB_QUAL
3-Methylphenol and 4-Methylphenol	65794-96-9	4.6	ug/L	5.5	J	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	J
3-Methylphenol and 4-Methylphenol	65794-96-9	1.8	ug/L	4.8	J	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	J
3-Methylphenol and 4-Methylphenol	65794-96-9	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Acenaphthene	83-32-9	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Acenaphthene	83-32-9	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Acenaphthene	83-32-9	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Acenaphthylene	208-96-8	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Acenaphthylene	208-96-8	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Acenaphthylene	208-96-8	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Acetone	67-64-1	50.2	ug/L	50	J	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	20	N	
Acetone	67-64-1	98.9	ug/L	130	J	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	50	N	J
Aluminum	7429-90-5	243	ug/L	200	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	11	N	
Aluminum	7429-90-5	39.6	ug/L	200	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	11	N	B
Aluminum	7429-90-5	27.3	ug/L	200	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	11	N	B
Aluminum-fil	7429-90-5	29.4	ug/L	200	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	11	Y	B
Aluminum-fil	7429-90-5	27.1	ug/L	200	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	11	Y	B
Aluminum-fil	7429-90-5	20.8	ug/L	200	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	11	Y	B
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.049	N	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.048	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.075	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.074	N	U
Anthracene	120-12-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Anthracene	120-12-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Anthracene	120-12-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	4.5	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	4.5	N	U
Antimony	7440-36-0	6	ug/L	12	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	4.5	N	U
Antimony-fil	7440-36-0	6.9	ug/L	6		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	4.5	Y	
Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	4.5	Y	U
Antimony-fil	7440-36-0	6	ug/L	12	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	4.5	Y	U
Arsenic	7440-38-2	23.1	ug/L	10		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.6	N	
Arsenic	7440-38-2	129	ug/L	10		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.6	N	
Arsenic	7440-38-2	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.6	N	U
Arsenic-fil	7440-38-2	13.6	ug/L	10		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.6	Y	
Arsenic-fil	7440-38-2	141	ug/L	10		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.6	Y	
Arsenic-fil	7440-38-2	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.6	Y	U
Barium	7440-39-3	392	ug/L	200		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	5	N	
Barium	7440-39-3	4250	ug/L	400		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	10	N	
Barium	7440-39-3	11200	ug/L	800		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	20	N	
Barium-fil	7440-39-3	342	ug/L	200		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	5	Y	
Barium-fil	7440-39-3	4250	ug/L	400		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	10	Y	
Barium-fil	7440-39-3	10300	ug/L	800		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	20	Y	
Benzene	71-43-2	403	ug/L	10		WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	4	N	
Benzene	71-43-2	5.6	ug/L	2		WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.8	N	
Benzene	71-43-2	19.7	ug/L	5		WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	2	N	
Benzo(a)anthracene	56-55-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Benzo(a)anthracene	56-55-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(a)anthracene	56-55-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Benzo(a)pyrene	50-32-8	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Benzo(a)pyrene	50-32-8	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(a)pyrene	50-32-8	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Benzo(b)fluoranthene	205-99-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Benzo(b)fluoranthene	205-99-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(b)fluoranthene	205-99-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Benzo(ghi)perylene	191-24-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Benzo(ghi)perylene	191-24-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(ghi)perylene	191-24-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Benzo(k)fluoranthene	207-08-9	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Benzo(k)fluoranthene	207-08-9	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(k)fluoranthene	207-08-9	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Benzoic acid	65-85-0	13.5	ug/L	27	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	11	N	U
Benzoic acid	65-85-0	12	ug/L	24	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Benzoic acid	65-85-0	50	ug/L	100	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	41	N	U
Benzyl alcohol	100-51-6	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Benzyl alcohol	100-51-6	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzyl alcohol	100-51-6	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Beryllium	7440-41-7	10	ug/L	20	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	5	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1	N	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1	Y	U
Bis(2-chloroethoxy)methane	111-91-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bis(2-chloroethoxy)methane	111-91-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Bis(2-chloroethyl)ether	111-44-4	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Bis(2-chloroethyl)ether	111-44-4	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bis(2-chloroethyl)ether	111-44-4	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bis(2-chloroisopropyl)ether	108-60-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Bromodichloromethane	75-27-4	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2	N	U
Bromodichloromethane	75-27-4	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.4	N	U
Bromodichloromethane	75-27-4	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1	N	U
Bromoform	75-25-2	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3.3	N	U
Bromoform	75-25-2	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.7	N	U
Bromoform	75-25-2	1	ug/L	2	UJ	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.66	N	U
Bromomethane	74-83-9	10	ug/L	20	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	7.8	N	U
Bromomethane	74-83-9	2	ug/L	4	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	1.6	N	U
Bromomethane	74-83-9	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	3.9	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bromophenyl phenyl ether, 4-	101-55-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Butanone, 2-	78-93-3	172	ug/L	50		WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	20	N	

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Butanone, 2-	78-93-3	11.9	ug/L	10		WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	4	N	
Butanone, 2-	78-93-3	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	10	N	U
Butyl benzyl phthalate	85-68-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Butyl benzyl phthalate	85-68-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Butyl benzyl phthalate	85-68-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1	N	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1	Y	U
Calcium	7440-70-2	171000	ug/L	1000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	100	N	
Calcium	7440-70-2	283000	ug/L	1000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	100	N	
Calcium	7440-70-2	296000	ug/L	1000	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	100	N	
Calcium-fil	7440-70-2	151000	ug/L	1000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	100	Y	
Calcium-fil	7440-70-2	280000	ug/L	1000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	100	Y	
Calcium-fil	7440-70-2	282000	ug/L	1000		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	100	Y	
Carbazole	86-74-8	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Carbazole	86-74-8	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Carbazole	86-74-8	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Carbon disulfide	75-15-0	2.8	ug/L	4	J	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.8	N	JB
Carbon disulfide	75-15-0	10	ug/L	20	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	4	N	U
Carbon disulfide	75-15-0	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	2	N	U
Carbon tetrachloride	56-23-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.2	N	U
Carbon tetrachloride	56-23-5	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.44	N	U
Carbon tetrachloride	56-23-5	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	U
Chloride	16887-00-6	1960000	ug/L	200000		WTP1-BEDGW-002	WW3030	GEN CHEMISTRY	REG	29-Oct-09	100000	N	
Chloride	16887-00-6	1070000	ug/L	100000		WTP1-BEDGW-003	WW3020	GEN CHEMISTRY	REG	9-May-09	50000	N	
Chloride	16887-00-6	1870000	ug/L	200000		WTP1-BEDGW-003	WW3031	GEN CHEMISTRY	REG	3-Nov-09	100000	N	
Chloro-3-methylphenol, 4-	59-50-7	1.5	ug/L	4.8	J	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	J
Chloro-3-methylphenol, 4-	59-50-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Chloro-3-methylphenol, 4-	59-50-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Chloroaniline, 4-	106-47-8	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Chloroaniline, 4-	106-47-8	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chloroaniline, 4-	106-47-8	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Chlorobenzene	108-90-7	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.2	N	U
Chlorobenzene	108-90-7	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.44	N	U
Chlorobenzene	108-90-7	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	U
Chloroethane	75-00-3	10	ug/L	20	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	4.8	N	U
Chloroethane	75-00-3	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	2.4	N	U
Chloroethane	75-00-3	2	ug/L	4	UJ	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.96	N	U
Chloroform	67-66-3	19.7	ug/L	5		WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.4	N	
Chloroform	67-66-3	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.8	N	U
Chloroform	67-66-3	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.56	N	U
Chloromethane	74-87-3	31.3	ug/L	10		WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	3.1	N	
Chloromethane	74-87-3	10	ug/L	20	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	6.1	N	U
Chloromethane	74-87-3	2	ug/L	4	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	1.2	N	U
Chloronaphthalene, 2-	91-58-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Chloronaphthalene, 2-	91-58-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Chloronaphthalene, 2-	91-58-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Chlorophenol, 2-	95-57-8	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.3	N	U
Chlorophenol, 2-	95-57-8	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Chlorophenol, 2-	95-57-8	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.9	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Chromium	7440-47-3	3.3	ug/L	10	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1.6	N	B
Chromium	7440-47-3	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1.6	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1.6	N	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1.6	Y	U
Chrysene	218-01-9	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Chrysene	218-01-9	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chrysene	218-01-9	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.83	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.83	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.83	N	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.83	Y	U
Copper	7440-50-8	5.8	ug/L	25	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	2.1	N	B
Copper	7440-50-8	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	2.1	N	U
Copper	7440-50-8	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	2.1	N	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	2.1	Y	U
Cyanide, total	57-12-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	GEN CHEMISTRY	REG	29-Oct-09	5	N	U
Cyanide, total	57-12-5	42	ug/L	10	J	WTP1-BEDGW-003	WW3020	GEN CHEMISTRY	REG	9-May-09	5	N	
Cyanide, total	57-12-5	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	GEN CHEMISTRY	REG	3-Nov-09	5	N	U
Dibenz(a,h)anthracene	53-70-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dibenz(a,h)anthracene	53-70-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dibenz(a,h)anthracene	53-70-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dibenzofuran	132-64-9	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dibenzofuran	132-64-9	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dibenzofuran	132-64-9	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dibromochloromethane	124-48-1	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2	N	U
Dibromochloromethane	124-48-1	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.4	N	U
Dibromochloromethane	124-48-1	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1	N	U
Dichlorobenzene, 1,2-	95-50-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dichlorobenzene, 1,2-	95-50-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dichlorobenzene, 1,2-	95-50-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dichlorobenzene, 1,3-	541-73-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dichlorobenzene, 1,3-	541-73-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dichlorobenzene, 1,3-	541-73-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dichlorobenzene, 1,4-	106-46-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dichlorobenzene, 1,4-	106-46-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dichlorobenzene, 1,4-	106-46-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dichlorobenzidine, 3,3'-	91-94-1	5.5	ug/L	11	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
Dichlorobenzidine, 3,3'-	91-94-1	4.8	ug/L	9.6	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Dichlorobenzidine, 3,3'-	91-94-1	20.5	ug/L	41	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Dichloroethane, 1,1-	75-34-3	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.4	N	U
Dichloroethane, 1,1-	75-34-3	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.48	N	U
Dichloroethane, 1,1-	75-34-3	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.2	N	U
Dichloroethane, 1,2-	107-06-2	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3.4	N	U
Dichloroethane, 1,2-	107-06-2	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.68	N	U
Dichloroethane, 1,2-	107-06-2	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.7	N	U
Dichloroethene, 1,1-	75-35-4	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	5.4	N	U
Dichloroethene, 1,1-	75-35-4	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	1.1	N	U
Dichloroethene, 1,1-	75-35-4	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	2.7	N	U
Dichloroethene, cis-1,2-	156-59-2	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2	N	U
Dichloroethene, cis-1,2-	156-59-2	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.4	N	U
Dichloroethene, cis-1,2-	156-59-2	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1	N	U
Dichloroethene, trans-1,2-	156-60-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	4.5	N	U
Dichloroethene, trans-1,2-	156-60-5	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.9	N	U
Dichloroethene, trans-1,2-	156-60-5	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	2.3	N	U
Dichlorophenol, 2,4-	120-83-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.4	N	U
Dichlorophenol, 2,4-	120-83-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Dichlorophenol, 2,4-	120-83-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	5.4	N	U
Dichloropropane, 1,2-	78-87-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.1	N	U
Dichloropropane, 1,2-	78-87-5	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.42	N	U
Dichloropropane, 1,2-	78-87-5	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	U
Dichloropropene, cis-1,3-	10061-01-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.1	N	U
Dichloropropene, cis-1,3-	10061-01-5	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.42	N	U
Dichloropropene, cis-1,3-	10061-01-5	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	U
Dichloropropene, trans-1,3-	10061-02-6	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.1	N	U
Dichloropropene, trans-1,3-	10061-02-6	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.42	N	U
Dichloropropene, trans-1,3-	10061-02-6	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	U
Diethyl phthalate	84-66-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
Diethyl phthalate	84-66-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Diethyl phthalate	84-66-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Dimethyl phthalate	131-11-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dimethyl phthalate	131-11-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dimethyl phthalate	131-11-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dimethylphenol, 2,4-	105-67-9	16.1	ug/L	5.5		WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.3	N	
Dimethylphenol, 2,4-	105-67-9	6.9	ug/L	4.8		WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.2	N	
Dimethylphenol, 2,4-	105-67-9	11.5	ug/L	21	J	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.9	N	J
Di-n-butyl phthalate	84-74-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Di-n-butyl phthalate	84-74-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Di-n-butyl phthalate	84-74-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	5.5	ug/L	11	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	4.4	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	4.8	ug/L	9.6	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	3.8	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	20.5	ug/L	41	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	16	N	U
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.05	N	U
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.049	N	U
Dinitrophenol, 2,4-	51-28-5	13.5	ug/L	27	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	11	N	U
Dinitrophenol, 2,4-	51-28-5	12	ug/L	24	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	9.6	N	U

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dinitrophenol, 2,4-	51-28-5	50	ug/L	100	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	41	N	U
Dinitrotoluene, 2,4-	121-14-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dinitrotoluene, 2,4-	121-14-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dinitrotoluene, 2,4-	121-14-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dinitrotoluene, 2,4-	121-14-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.063	N	U
Dinitrotoluene, 2,4-	121-14-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.062	N	U
Dinitrotoluene, 2,6-	606-20-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Dinitrotoluene, 2,6-	606-20-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dinitrotoluene, 2,6-	606-20-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Dinitrotoluene, 2,6-	606-20-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.09	N	U
Dinitrotoluene, 2,6-	606-20-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.089	N	U
Di-n-octyl phthalate	117-84-0	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.6	N	U
Di-n-octyl phthalate	117-84-0	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.4	N	U
Di-n-octyl phthalate	117-84-0	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	6.2	N	U
Ethylbenzene	100-41-4	172	ug/L	10		WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	4.3	N	
Ethylbenzene	100-41-4	16.4	ug/L	2		WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.86	N	
Ethylbenzene	100-41-4	37.7	ug/L	5		WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	2.2	N	
Fluoranthene	206-44-0	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Fluoranthene	206-44-0	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Fluoranthene	206-44-0	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Fluorene	86-73-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Fluorene	86-73-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Fluorene	86-73-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Hexachlorobenzene	118-74-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Hexachlorobenzene	118-74-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Hexachlorobenzene	118-74-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Hexachlorobutadiene	87-68-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.7	N	U
Hexachlorobutadiene	87-68-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	2.4	N	U
Hexachlorobutadiene	87-68-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	10	N	U
Hexachlorocyclopentadiene	77-47-4	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.4	N	U
Hexachlorocyclopentadiene	77-47-4	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Hexachlorocyclopentadiene	77-47-4	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	5.4	N	U
Hexachloroethane	67-72-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.7	N	U
Hexachloroethane	67-72-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	2.4	N	U
Hexachloroethane	67-72-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	10	N	U
Hexanone, 2-	591-78-6	50	ug/L	100	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	50	N	U
Hexanone, 2-	591-78-6	10	ug/L	20	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	10	N	U
Hexanone, 2-	591-78-6	25	ug/L	50	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	25	N	U
HMX	2691-41-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.11	N	U
HMX	2691-41-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.2	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.5	N	U
Iron	7439-89-6	2600	ug/L	300		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	23	N	
Iron	7439-89-6	150	ug/L	300	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	23	N	U
Iron	7439-89-6	150	ug/L	300	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	23	N	U
Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	23	Y	U
Iron-fil	7439-89-6	300	ug/L	600	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	460	Y	U
Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	23	Y	U

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Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Isophorone	78-59-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Isophorone	78-59-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Isophorone	78-59-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Lead	7439-92-1	2.5	ug/L	5	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	2	N	U
Lead	7439-92-1	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	2	N	U
Lead	7439-92-1	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	2	N	U
Lead-fil	7439-92-1	2.4	ug/L	10	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	2	Y	B
Lead-fil	7439-92-1	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	2	Y	U
Lead-fil	7439-92-1	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	2	Y	U
Magnesium	7439-95-4	128000	ug/L	5000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	100	N	
Magnesium	7439-95-4	156000	ug/L	5000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	100	N	
Magnesium	7439-95-4	213000	ug/L	5000		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	100	N	
Magnesium-fil	7439-95-4	120000	ug/L	5000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	100	Y	
Magnesium-fil	7439-95-4	157000	ug/L	5000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	100	Y	
Magnesium-fil	7439-95-4	205000	ug/L	5000		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	100	Y	
Manganese	7439-96-5	61	ug/L	15		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.5	N	
Manganese	7439-96-5	860	ug/L	15		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.5	N	
Manganese	7439-96-5	45.6	ug/L	15		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.5	N	
Manganese-fil	7439-96-5	35.2	ug/L	15		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.5	Y	
Manganese-fil	7439-96-5	844	ug/L	15		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.5	Y	
Manganese-fil	7439-96-5	40.7	ug/L	15		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.5	Y	
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.14	N	U
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.14	N	U
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.14	N	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.14	Y	U
Methyl-2-pentanone, 4-	108-10-1	25	ug/L	50	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	20	N	U
Methyl-2-pentanone, 4-	108-10-1	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	4	N	U
Methyl-2-pentanone, 4-	108-10-1	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	10	N	U
Methylene chloride	75-09-2	12.9	ug/L	50	J	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	10	N	J
Methylene chloride	75-09-2	12.5	ug/L	25	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	5	N	U
Methylene chloride	75-09-2	5	ug/L	10	UJ	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	2	N	U
Methylnaphthalene, 2-	91-57-6	12.8	ug/L	5.5		WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	
Methylnaphthalene, 2-	91-57-6	12.3	ug/L	4.8		WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	
Methylnaphthalene, 2-	91-57-6	13.9	ug/L	21	J	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	J
Methylphenol, 2-	95-48-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Methylphenol, 2-	95-48-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Methylphenol, 2-	95-48-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Naphthalene	91-20-3	19.5	ug/L	5.5		WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	
Naphthalene	91-20-3	13.7	ug/L	4.8		WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	
Naphthalene	91-20-3	18.5	ug/L	21	J	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	J
Nickel	7440-02-0	3.8	ug/L	40	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	2.3	N	B
Nickel	7440-02-0	4.6	ug/L	40	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	2.3	N	B
Nickel	7440-02-0	20	ug/L	40	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	2.3	N	U
Nickel-fil	7440-02-0	2.5	ug/L	40	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	2.3	Y	B
Nickel-fil	7440-02-0	20	ug/L	40	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	2.3	Y	U
Nickel-fil	7440-02-0	20	ug/L	40	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	2.3	Y	U
Nitrate-Nitrite	10-28-6	190	ug/L	100		WTP1-BEDGW-002	WW3030	GEN CHEMISTRY	REG	29-Oct-09	30	N	

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Nitrate-Nitrite	10-28-6	2200	ug/L	2000		WTP1-BEDGW-003	WW3020	GEN CHEMISTRY	REG	9-May-09	740	N	
Nitrate-Nitrite	10-28-6	930	ug/L	100		WTP1-BEDGW-003	WW3031	GEN CHEMISTRY	REG	3-Nov-09	30	N	
Nitroaniline, 2-	88-74-4	5.5	ug/L	11	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
Nitroaniline, 2-	88-74-4	4.8	ug/L	9.6	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Nitroaniline, 2-	88-74-4	20.5	ug/L	41	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Nitroaniline, 3-	99-09-2	5.5	ug/L	11	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
Nitroaniline, 3-	99-09-2	4.8	ug/L	9.6	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Nitroaniline, 3-	99-09-2	20.5	ug/L	41	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Nitroaniline, 4-	100-01-6	5.5	ug/L	11	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
Nitroaniline, 4-	100-01-6	4.8	ug/L	9.6	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Nitroaniline, 4-	100-01-6	20.5	ug/L	41	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Nitrobenzene	98-95-3	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Nitrobenzene	98-95-3	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Nitrobenzene	98-95-3	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.049	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.048	N	U
Nitrophenol, 2-	88-75-5	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.4	N	U
Nitrophenol, 2-	88-75-5	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Nitrophenol, 2-	88-75-5	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	5.4	N	U
Nitrophenol, 4-	100-02-7	13.5	ug/L	27	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	11	N	U
Nitrophenol, 4-	100-02-7	12	ug/L	24	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Nitrophenol, 4-	100-02-7	50	ug/L	100	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	41	N	U
Nitrotoluene, 2-	88-72-2	0.19	ug/L	0.38	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.38	N	U
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.062	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.094	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.093	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.074	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.073	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
n-Nitroso-di-n-propylamine	621-64-7	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
n-Nitrosodiphenylamine	86-30-6	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	2.2	N	U
n-Nitrosodiphenylamine	86-30-6	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.9	N	U
n-Nitrosodiphenylamine	86-30-6	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	8.2	N	U
Pentachlorophenol	87-86-5	13.5	ug/L	27	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	11	N	U
Pentachlorophenol	87-86-5	12	ug/L	24	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Pentachlorophenol	87-86-5	50	ug/L	100	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	41	N	U
Phenanthrene	85-01-8	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Phenanthrene	85-01-8	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Phenanthrene	85-01-8	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Phenol	108-95-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Phenol	108-95-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Phenol	108-95-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
Potassium	7440-09-7	68100	ug/L	10000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	100	N	
Potassium	7440-09-7	95900	ug/L	20000	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	200	N	
Potassium	7440-09-7	104000	ug/L	40000	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	400	N	
Potassium-fil	7440-09-7	98300	ug/L	20000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	200	Y	
Potassium-fil	7440-09-7	67000	ug/L	10000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	100	Y	
Potassium-fil	7440-09-7	95800	ug/L	40000		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	400	Y	

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Pyrene	129-00-0	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Pyrene	129-00-0	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Pyrene	129-00-0	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U
RDX	121-82-4	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.073	N	U
RDX	121-82-4	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.072	N	U
Selenium	7782-49-2	3.4	ug/L	20	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.1	N	B
Selenium	7782-49-2	5.5	ug/L	10	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.1	N	B
Selenium	7782-49-2	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.1	N	U
Selenium-fil	7782-49-2	4.8	ug/L	20	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.1	Y	B
Selenium-fil	7782-49-2	5.2	ug/L	10	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.1	Y	B
Selenium-fil	7782-49-2	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.1	Y	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1.2	N	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	1.2	Y	U
Sodium	7440-23-5	1040000	ug/L	200000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	10000	N	
Sodium	7440-23-5	710000	ug/L	100000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	5000	N	
Sodium	7440-23-5	1050000	ug/L	400000		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	20000	N	
Sodium-fil	7440-23-5	1050000	ug/L	200000		WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	10000	Y	
Sodium-fil	7440-23-5	701000	ug/L	100000		WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	5000	Y	
Sodium-fil	7440-23-5	1020000	ug/L	400000		WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	20000	Y	
Styrene	100-42-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3.6	N	U
Styrene	100-42-5	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.8	N	U
Styrene	100-42-5	1	ug/L	2	UJ	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.72	N	U
Sulfate	14808-79-8	100000	ug/L	200000	U	WTP1-BEDGW-002	WW3030	GEN CHEMISTRY	REG	29-Oct-09	100000	N	U
Sulfate	14808-79-8	28600	ug/L	2000		WTP1-BEDGW-003	WW3020	GEN CHEMISTRY	REG	9-May-09	1000	N	
Sulfate	14808-79-8	14300	ug/L	10000		WTP1-BEDGW-003	WW3031	GEN CHEMISTRY	REG	3-Nov-09	5000	N	
Tetrachloroethane, 1,1,2,2-	79-34-5	2.5	ug/L	5	J	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	J
Tetrachloroethane, 1,1,2,2-	79-34-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.1	N	U
Tetrachloroethane, 1,1,2,2-	79-34-5	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.42	N	U
Tetrachloroethene	127-18-4	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.2	N	U
Tetrachloroethene	127-18-4	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.44	N	U
Tetrachloroethene	127-18-4	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.1	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.076	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.075	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.4	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.4	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.4	N	U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.4	Y	U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.4	Y	U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.4	Y	U
Toluene	108-88-3	530	ug/L	10		WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3.5	N	
Toluene	108-88-3	31.8	ug/L	2		WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.7	N	
Toluene	108-88-3	74.3	ug/L	5		WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.8	N	
Trichlorobenzene, 1,2,4-	120-82-1	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Trichlorobenzene, 1,2,4-	120-82-1	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	4.1	N	U

Table E-3
Bedrock Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trichloroethane, 1,1,1-	71-55-6	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3.3	N	U
Trichloroethane, 1,1,1-	71-55-6	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.66	N	U
Trichloroethane, 1,1,1-	71-55-6	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.7	N	U
Trichloroethane, 1,1,2-	79-00-5	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	2.6	N	U
Trichloroethane, 1,1,2-	79-00-5	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.52	N	U
Trichloroethane, 1,1,2-	79-00-5	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.3	N	U
Trichloroethene	79-01-6	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3.2	N	U
Trichloroethene	79-01-6	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.64	N	U
Trichloroethene	79-01-6	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.6	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.5	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.3	N	U
Trichlorophenol, 2,4,5-	95-95-4	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	5.8	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.75	ug/L	5.5	U	WTP1-BEDGW-002	WW3030	SEMIVOLATILES	REG	29-Oct-09	1.5	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.4	ug/L	4.8	U	WTP1-BEDGW-003	WW3020	SEMIVOLATILES	REG	9-May-09	1.3	N	U
Trichlorophenol, 2,4,6-	88-06-2	10.5	ug/L	21	U	WTP1-BEDGW-003	WW3031	SEMIVOLATILES	REG	3-Nov-09	5.8	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.049	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.048	N	U
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3020	EXPLOSIVES	REG	9-May-09	0.067	N	U
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	UJ	WTP1-BEDGW-003	WW3031	EXPLOSIVES	REG	3-Nov-09	0.066	N	U
Vanadium	7440-62-2	2.5	ug/L	50	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.66	N	B
Vanadium	7440-62-2	1.6	ug/L	50	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.66	N	B
Vanadium	7440-62-2	2.5	ug/L	50	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.66	N	B
Vanadium-fil	7440-62-2	1.1	ug/L	50	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	0.66	Y	B
Vanadium-fil	7440-62-2	2.1	ug/L	50	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	0.66	Y	B
Vanadium-fil	7440-62-2	2	ug/L	50	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	0.66	Y	B
Vinyl chloride	75-01-4	5	ug/L	10	U	WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	3	N	U
Vinyl chloride	75-01-4	1	ug/L	2	U	WTP1-BEDGW-003	WW3020	VOLATILES	REG	9-May-09	0.6	N	U
Vinyl chloride	75-01-4	2.5	ug/L	5	U	WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	1.5	N	U
Xylenes, total	1330-20-7	1040	ug/L	30		WTP1-BEDGW-002	WW3030	VOLATILES	REG	29-Oct-09	12	N	
Xylenes, total	1330-20-7	625	ug/L	15		WTP1-BEDGW-003	WW3031	VOLATILES	REG	3-Nov-09	5.8	N	
Zinc	7440-66-6	14	ug/L	20	J	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.8	N	B
Zinc	7440-66-6	10	ug/L	20	U	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.8	N	U
Zinc-fil	7440-66-6	9.7	ug/L	20	J	WTP1-BEDGW-003	WW3020	METALS	REG	9-May-09	3.8	Y	B
Zinc-fil	7440-66-6	8.8	ug/L	20	J	WTP1-BEDGW-003	WW3031	METALS	REG	3-Nov-09	3.8	Y	B
Zinc-fil	7440-66-6	10	ug/L	20	U	WTP1-BEDGW-002	WW3030	METALS	REG	29-Oct-09	3.8	Y	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

PARAMETER	CASNUM	RES	UNIT	DETLIMIT	VQUAL	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	PURPOSE	SAMPLE_DATE	METH_DET_LIM	FILTERED	LAB_QUAL
3-Methylphenol and 4-Methylphenol	65794-96-9	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
3-Methylphenol and 4-Methylphenol	65794-96-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
3-Methylphenol and 4-Methylphenol	65794-96-9	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
3-Methylphenol and 4-Methylphenol	65794-96-9	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
3-Methylphenol and 4-Methylphenol	65794-96-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
3-Methylphenol and 4-Methylphenol	65794-96-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Acenaphthene	83-32-9	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Acenaphthene	83-32-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Acenaphthene	83-32-9	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Acenaphthene	83-32-9	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Acenaphthene	83-32-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Acenaphthene	83-32-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Acenaphthylene	208-96-8	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Acenaphthylene	208-96-8	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Acenaphthylene	208-96-8	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Acenaphthylene	208-96-8	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Acenaphthylene	208-96-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Acenaphthylene	208-96-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Acetone	67-64-1	49.2	ug/L	25	J	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	10	N	
Acetone	67-64-1	12.5	ug/L	25	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	10	N	U
Acetone	67-64-1	12.5	ug/L	25	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	10	N	U
Acetone	67-64-1	12.5	ug/L	25	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	10	N	U
Acetone	67-64-1	12.5	ug/L	25	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	10	N	U
Aluminum	7429-90-5	560	ug/L	200		WTP1-MW02	WW3016	METALS	REG	8-May-09	11	N	
Aluminum	7429-90-5	92.7	ug/L	200	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	11	N	B
Aluminum	7429-90-5	1010	ug/L	200	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	11	N	
Aluminum	7429-90-5	132	ug/L	200	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	11	N	B
Aluminum	7429-90-5	539	ug/L	200	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	11	N	
Aluminum	7429-90-5	100	ug/L	200	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	11	N	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	1.3	ug/L	0.19		WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.048	N	
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.14	ug/L	0.2	J	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.049	N	J
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.048	N	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.048	N	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.048	N	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.048	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	2.2	ug/L	0.19		WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.074	N	
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.075	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.073	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.073	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.074	N	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.073	N	U
Anthracene	120-12-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Anthracene	120-12-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Anthracene	120-12-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Anthracene	120-12-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Anthracene	120-12-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Anthracene	120-12-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	4.5	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	4.5	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	4.5	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	4.5	N	U
Antimony	7440-36-0	3	ug/L	6	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	4.5	N	U

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Antimony	7440-36-0	3	ug/L	6	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	4.5	N	U
Arsenic	7440-38-2	7.7	ug/L	10	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.6	N	B
Arsenic	7440-38-2	7.2	ug/L	10	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.6	N	B
Arsenic	7440-38-2	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.6	N	U
Arsenic	7440-38-2	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.6	N	U
Arsenic	7440-38-2	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.6	N	U
Arsenic	7440-38-2	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.6	N	U
Barium	7440-39-3	84.8	ug/L	200	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	5	N	B
Barium	7440-39-3	161	ug/L	200	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	5	N	B
Barium	7440-39-3	66	ug/L	200	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	5	N	B
Barium	7440-39-3	105	ug/L	200	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	5	N	B
Barium	7440-39-3	86.2	ug/L	200	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	5	N	B
Barium	7440-39-3	132	ug/L	200	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	5	N	B
Benzene	71-43-2	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.4	N	U
Benzene	71-43-2	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.4	N	U
Benzene	71-43-2	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.4	N	U
Benzene	71-43-2	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.4	N	U
Benzene	71-43-2	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.4	N	U
Benzene	71-43-2	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.4	N	U
Benzo(a)anthracene	56-55-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Benzo(a)anthracene	56-55-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Benzo(a)anthracene	56-55-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Benzo(a)anthracene	56-55-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Benzo(a)anthracene	56-55-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(a)anthracene	56-55-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Benzo(a)pyrene	50-32-8	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Benzo(a)pyrene	50-32-8	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Benzo(a)pyrene	50-32-8	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Benzo(a)pyrene	50-32-8	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Benzo(a)pyrene	50-32-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(a)pyrene	50-32-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Benzo(b)fluoranthene	205-99-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Benzo(b)fluoranthene	205-99-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Benzo(b)fluoranthene	205-99-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Benzo(b)fluoranthene	205-99-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Benzo(b)fluoranthene	205-99-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(b)fluoranthene	205-99-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Benzo(ghi)perylene	191-24-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Benzo(ghi)perylene	191-24-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Benzo(ghi)perylene	191-24-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Benzo(ghi)perylene	191-24-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Benzo(ghi)perylene	191-24-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(ghi)perylene	191-24-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Benzo(k)fluoranthene	207-08-9	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Benzo(k)fluoranthene	207-08-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Benzo(k)fluoranthene	207-08-9	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Benzo(k)fluoranthene	207-08-9	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Benzo(k)fluoranthene	207-08-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzo(k)fluoranthene	207-08-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Benzoic acid	65-85-0	12	ug/L	24	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	9.5	N	U
Benzoic acid	65-85-0	12.5	ug/L	25	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	9.9	N	U
Benzoic acid	65-85-0	12	ug/L	24	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	9.6	N	U
Benzoic acid	65-85-0	13	ug/L	26	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	10	N	U

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Benzoic acid	65-85-0	12	ug/L	24	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Benzoic acid	65-85-0	12	ug/L	24	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	9.5	N	U
Benzyl alcohol	100-51-6	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Benzyl alcohol	100-51-6	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Benzyl alcohol	100-51-6	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Benzyl alcohol	100-51-6	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Benzyl alcohol	100-51-6	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Benzyl alcohol	100-51-6	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1	N	U
Beryllium	7440-41-7	2	ug/L	4	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bis(2-chloroethoxy)methane	111-91-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Bis(2-chloroethyl)ether	111-44-4	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Bis(2-chloroethyl)ether	111-44-4	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Bis(2-chloroethyl)ether	111-44-4	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Bis(2-chloroethyl)ether	111-44-4	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Bis(2-chloroethyl)ether	111-44-4	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bis(2-chloroethyl)ether	111-44-4	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bis(2-chloroisopropyl)ether	108-60-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	6.5	ug/L	5		WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	
Bis(2-ethylhexyl)phthalate	117-81-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Bis(2-ethylhexyl)phthalate	117-81-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Bromodichloromethane	75-27-4	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.2	N	U
Bromodichloromethane	75-27-4	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.2	N	U
Bromodichloromethane	75-27-4	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.2	N	U
Bromodichloromethane	75-27-4	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.2	N	U
Bromodichloromethane	75-27-4	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.2	N	U
Bromodichloromethane	75-27-4	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.2	N	U
Bromoform	75-25-2	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.33	N	U
Bromoform	75-25-2	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.33	N	U
Bromoform	75-25-2	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.33	N	U
Bromoform	75-25-2	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.33	N	U
Bromoform	75-25-2	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.33	N	U
Bromoform	75-25-2	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.33	N	U
Bromomethane	74-83-9	1	ug/L	2	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.78	N	U
Bromomethane	74-83-9	1	ug/L	2	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.78	N	U
Bromomethane	74-83-9	1	ug/L	2	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.78	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Bromomethane	74-83-9	1	ug/L	2	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.78	N	U
Bromomethane	74-83-9	1	ug/L	2	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.78	N	U
Bromomethane	74-83-9	1	ug/L	2	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.78	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Bromophenyl phenyl ether, 4-	101-55-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Butanone, 2-	78-93-3	17.5	ug/L	5		WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	2	N	
Butanone, 2-	78-93-3	2.5	ug/L	5	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	2	N	U
Butanone, 2-	78-93-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	2	N	U
Butanone, 2-	78-93-3	2.5	ug/L	5	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	2	N	U
Butanone, 2-	78-93-3	2.5	ug/L	5	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	2	N	U
Butanone, 2-	78-93-3	2.5	ug/L	5	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	2	N	U
Butyl benzyl phthalate	85-68-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Butyl benzyl phthalate	85-68-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Butyl benzyl phthalate	85-68-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Butyl benzyl phthalate	85-68-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Butyl benzyl phthalate	85-68-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Butyl benzyl phthalate	85-68-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1	N	U
Cadmium	7440-43-9	2.5	ug/L	5	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1	N	U
Calcium	7440-70-2	87600	ug/L	1000		WTP1-MW01	WW3015	METALS	REG	7-May-09	100	N	
Calcium	7440-70-2	73500	ug/L	1000		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	100	N	
Calcium	7440-70-2	28900	ug/L	1000		WTP1-MW02	WW3016	METALS	REG	8-May-09	100	N	
Calcium	7440-70-2	33700	ug/L	1000		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	100	N	
Calcium	7440-70-2	30300	ug/L	1000		WTP1-MW03	WW3017	METALS	REG	9-May-09	100	N	
Calcium	7440-70-2	34900	ug/L	1000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	100	N	
Carbazole	86-74-8	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Carbazole	86-74-8	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Carbazole	86-74-8	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Carbazole	86-74-8	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Carbazole	86-74-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Carbazole	86-74-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Carbon disulfide	75-15-0	1.2	ug/L	2	J	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.4	N	J
Carbon disulfide	75-15-0	1	ug/L	2	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.4	N	U
Carbon disulfide	75-15-0	1	ug/L	2	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.4	N	U
Carbon disulfide	75-15-0	1	ug/L	2	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.4	N	U
Carbon disulfide	75-15-0	1	ug/L	2	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.4	N	U
Carbon disulfide	75-15-0	1	ug/L	2	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.4	N	U
Carbon tetrachloride	56-23-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.22	N	U
Carbon tetrachloride	56-23-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.22	N	U
Carbon tetrachloride	56-23-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.22	N	U
Carbon tetrachloride	56-23-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.22	N	U
Carbon tetrachloride	56-23-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.22	N	U
Carbon tetrachloride	56-23-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.22	N	U
Chloride	16887-00-6	5500	ug/L	2000		WTP1-MW01	WW3015	GEN CHEMISTRY	REG	7-May-09	1000	N	
Chloride	16887-00-6	9500	ug/L	2000		WTP1-MW02	WW3016	GEN CHEMISTRY	REG	8-May-09	1000	N	

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Chloride	16887-00-6	4600	ug/L	2000		WTP1-MW03	WW3017	GEN CHEMISTRY	REG	9-May-09	1000	N	
Chloride	16887-00-6	7000	ug/L	2000		WTP1-MW01	WW3027A	GEN CHEMISTRY	REG	28-Oct-09	1000	N	
Chloride	16887-00-6	9800	ug/L	2000		WTP1-MW02	WW3028A	GEN CHEMISTRY	REG	29-Oct-09	1000	N	
Chloride	16887-00-6	25800	ug/L	2000		WTP1-MW03	WW3029	GEN CHEMISTRY	REG	29-Oct-09	1000	N	
Chloro-3-methylphenol, 4-	59-50-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Chloro-3-methylphenol, 4-	59-50-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Chloro-3-methylphenol, 4-	59-50-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Chloro-3-methylphenol, 4-	59-50-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Chloro-3-methylphenol, 4-	59-50-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chloro-3-methylphenol, 4-	59-50-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Chloroaniline, 4-	106-47-8	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Chloroaniline, 4-	106-47-8	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Chloroaniline, 4-	106-47-8	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Chloroaniline, 4-	106-47-8	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Chloroaniline, 4-	106-47-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chloroaniline, 4-	106-47-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Chlorobenzene	108-90-7	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.22	N	U
Chlorobenzene	108-90-7	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.22	N	U
Chlorobenzene	108-90-7	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.22	N	U
Chlorobenzene	108-90-7	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.22	N	U
Chlorobenzene	108-90-7	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.22	N	U
Chlorobenzene	108-90-7	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.22	N	U
Chloroethane	75-00-3	1	ug/L	2	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.48	N	U
Chloroethane	75-00-3	1	ug/L	2	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.48	N	U
Chloroethane	75-00-3	1	ug/L	2	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.48	N	U
Chloroethane	75-00-3	1	ug/L	2	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.48	N	U
Chloroethane	75-00-3	1	ug/L	2	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.48	N	U
Chloroethane	75-00-3	1	ug/L	2	UJ	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.48	N	U
Chloroform	67-66-3	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.28	N	U
Chloroform	67-66-3	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.28	N	U
Chloroform	67-66-3	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.28	N	U
Chloroform	67-66-3	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.28	N	U
Chloroform	67-66-3	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.28	N	U
Chloroform	67-66-3	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.28	N	U
Chloromethane	74-87-3	1	ug/L	2	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.61	N	U
Chloromethane	74-87-3	1	ug/L	2	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.61	N	U
Chloromethane	74-87-3	1	ug/L	2	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.61	N	U
Chloromethane	74-87-3	1	ug/L	2	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.61	N	U
Chloromethane	74-87-3	1	ug/L	2	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.61	N	U
Chloromethane	74-87-3	1	ug/L	2	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.61	N	U
Chloronaphthalene, 2-	91-58-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Chloronaphthalene, 2-	91-58-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Chloronaphthalene, 2-	91-58-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Chloronaphthalene, 2-	91-58-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Chloronaphthalene, 2-	91-58-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chloronaphthalene, 2-	91-58-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Chlorophenol, 2-	95-57-8	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.1	N	U
Chlorophenol, 2-	95-57-8	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.2	N	U
Chlorophenol, 2-	95-57-8	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.2	N	U
Chlorophenol, 2-	95-57-8	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.2	N	U
Chlorophenol, 2-	95-57-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Chlorophenol, 2-	95-57-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U

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Chlorophenyl phenyl ether, 4-	7005-72-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chlorophenyl phenyl ether, 4-	7005-72-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1.6	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1.6	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1.6	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1.6	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1.6	N	U
Chromium	7440-47-3	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1.6	N	U
Chrysene	218-01-9	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Chrysene	218-01-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Chrysene	218-01-9	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Chrysene	218-01-9	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Chrysene	218-01-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Chrysene	218-01-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Cobalt	7440-48-4	1.1	ug/L	50	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.83	N	B
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	0.83	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.83	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	0.83	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	0.83	N	U
Cobalt	7440-48-4	25	ug/L	50	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.83	N	U
Copper	7440-50-8	8.4	ug/L	25	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	2.1	N	B
Copper	7440-50-8	5.9	ug/L	25	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	2.1	N	B
Copper	7440-50-8	12.5	ug/L	25	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	2.1	N	U
Copper	7440-50-8	12.5	ug/L	25	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	2.1	N	U
Copper	7440-50-8	12.5	ug/L	25	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	2.1	N	U
Copper	7440-50-8	12.5	ug/L	25	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	2.1	N	U
Cyanide, total	57-12-5	11	ug/L	10	J	WTP1-MW01	WW3015	GEN CHEMISTRY	REG	7-May-09	5	N	
Cyanide, total	57-12-5	18	ug/L	10	J	WTP1-MW02	WW3016	GEN CHEMISTRY	REG	8-May-09	5	N	
Cyanide, total	57-12-5	26	ug/L	10	J	WTP1-MW03	WW3017	GEN CHEMISTRY	REG	9-May-09	5	N	
Cyanide, total	57-12-5	5	ug/L	10	U	WTP1-MW01	WW3027A	GEN CHEMISTRY	REG	28-Oct-09	5	N	U
Cyanide, total	57-12-5	5	ug/L	10	U	WTP1-MW02	WW3028A	GEN CHEMISTRY	REG	29-Oct-09	5	N	U
Cyanide, total	57-12-5	5	ug/L	10	U	WTP1-MW03	WW3029	GEN CHEMISTRY	REG	29-Oct-09	5	N	U
Dibenz(a,h)anthracene	53-70-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dibenz(a,h)anthracene	53-70-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dibenz(a,h)anthracene	53-70-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dibenz(a,h)anthracene	53-70-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dibenz(a,h)anthracene	53-70-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dibenz(a,h)anthracene	53-70-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dibenzofuran	132-64-9	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dibenzofuran	132-64-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dibenzofuran	132-64-9	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dibenzofuran	132-64-9	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dibenzofuran	132-64-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dibenzofuran	132-64-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dibromochloromethane	124-48-1	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.2	N	U
Dibromochloromethane	124-48-1	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.2	N	U
Dibromochloromethane	124-48-1	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.2	N	U
Dibromochloromethane	124-48-1	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.2	N	U
Dibromochloromethane	124-48-1	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.2	N	U
Dibromochloromethane	124-48-1	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.2	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dichlorobenzene, 1,2-	95-50-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dichlorobenzene, 1,2-	95-50-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dichlorobenzene, 1,2-	95-50-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dichlorobenzene, 1,2-	95-50-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dichlorobenzene, 1,2-	95-50-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dichlorobenzene, 1,2-	95-50-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dichlorobenzene, 1,3-	541-73-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dichlorobenzene, 1,3-	541-73-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dichlorobenzene, 1,3-	541-73-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dichlorobenzene, 1,3-	541-73-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dichlorobenzene, 1,3-	541-73-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dichlorobenzene, 1,3-	541-73-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dichlorobenzene, 1,4-	106-46-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dichlorobenzene, 1,4-	106-46-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dichlorobenzene, 1,4-	106-46-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dichlorobenzene, 1,4-	106-46-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dichlorobenzene, 1,4-	106-46-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dichlorobenzene, 1,4-	106-46-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dichlorobenzidine, 3,3'-	91-94-1	4.75	ug/L	9.5	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
Dichlorobenzidine, 3,3'-	91-94-1	4.95	ug/L	9.9	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	U
Dichlorobenzidine, 3,3'-	91-94-1	4.8	ug/L	9.6	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
Dichlorobenzidine, 3,3'-	91-94-1	5	ug/L	10	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
Dichlorobenzidine, 3,3'-	91-94-1	4.8	ug/L	9.6	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Dichlorobenzidine, 3,3'-	91-94-1	4.75	ug/L	9.5	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Dichloroethane, 1,1-	75-34-3	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.24	N	U
Dichloroethane, 1,1-	75-34-3	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.24	N	U
Dichloroethane, 1,1-	75-34-3	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.24	N	U
Dichloroethane, 1,1-	75-34-3	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.24	N	U
Dichloroethane, 1,1-	75-34-3	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.24	N	U
Dichloroethane, 1,1-	75-34-3	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.24	N	U
Dichloroethane, 1,2-	107-06-2	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.34	N	U
Dichloroethane, 1,2-	107-06-2	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.34	N	U
Dichloroethane, 1,2-	107-06-2	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.34	N	U
Dichloroethane, 1,2-	107-06-2	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.34	N	U
Dichloroethane, 1,2-	107-06-2	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.34	N	U
Dichloroethane, 1,2-	107-06-2	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.34	N	U
Dichloroethene, 1,1-	75-35-4	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.54	N	U
Dichloroethene, 1,1-	75-35-4	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.54	N	U
Dichloroethene, 1,1-	75-35-4	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.54	N	U
Dichloroethene, 1,1-	75-35-4	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.54	N	U
Dichloroethene, 1,1-	75-35-4	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.54	N	U
Dichloroethene, 1,1-	75-35-4	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.54	N	U
Dichloroethene, cis-1,2-	156-59-2	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.2	N	U
Dichloroethene, cis-1,2-	156-59-2	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.2	N	U
Dichloroethene, cis-1,2-	156-59-2	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.2	N	U
Dichloroethene, cis-1,2-	156-59-2	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.2	N	U
Dichloroethene, cis-1,2-	156-59-2	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.2	N	U
Dichloroethene, cis-1,2-	156-59-2	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.2	N	U
Dichloroethene, trans-1,2-	156-60-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.45	N	U
Dichloroethene, trans-1,2-	156-60-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.45	N	U
Dichloroethene, trans-1,2-	156-60-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.45	N	U
Dichloroethene, trans-1,2-	156-60-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.45	N	U
Dichloroethene, trans-1,2-	156-60-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.45	N	U

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Dichloroethene, trans-1,2-	156-60-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.45	N	U
Dichlorophenol, 2,4-	120-83-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.2	N	U
Dichlorophenol, 2,4-	120-83-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.3	N	U
Dichlorophenol, 2,4-	120-83-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.2	N	U
Dichlorophenol, 2,4-	120-83-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.3	N	U
Dichlorophenol, 2,4-	120-83-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Dichlorophenol, 2,4-	120-83-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.2	N	U
Dichloropropane, 1,2-	78-87-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.21	N	U
Dichloropropane, 1,2-	78-87-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.21	N	U
Dichloropropane, 1,2-	78-87-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.21	N	U
Dichloropropane, 1,2-	78-87-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.21	N	U
Dichloropropane, 1,2-	78-87-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.21	N	U
Dichloropropane, 1,2-	78-87-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.21	N	U
Dichloropropene, cis-1,3-	10061-01-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.21	N	U
Dichloropropene, cis-1,3-	10061-01-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.21	N	U
Dichloropropene, cis-1,3-	10061-01-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.21	N	U
Dichloropropene, cis-1,3-	10061-01-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.21	N	U
Dichloropropene, cis-1,3-	10061-01-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.21	N	U
Dichloropropene, cis-1,3-	10061-01-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.21	N	U
Dichloropropene, trans-1,3-	10061-02-6	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.21	N	U
Dichloropropene, trans-1,3-	10061-02-6	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.21	N	U
Dichloropropene, trans-1,3-	10061-02-6	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.21	N	U
Dichloropropene, trans-1,3-	10061-02-6	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.21	N	U
Dichloropropene, trans-1,3-	10061-02-6	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.21	N	U
Dichloropropene, trans-1,3-	10061-02-6	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.21	N	U
Diethyl phthalate	84-66-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
Diethyl phthalate	84-66-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	U
Diethyl phthalate	84-66-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
Diethyl phthalate	84-66-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
Diethyl phthalate	84-66-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Diethyl phthalate	84-66-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Dimethyl phthalate	131-11-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dimethyl phthalate	131-11-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dimethyl phthalate	131-11-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dimethyl phthalate	131-11-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dimethyl phthalate	131-11-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dimethyl phthalate	131-11-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dimethylphenol, 2,4-	105-67-9	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.1	N	U
Dimethylphenol, 2,4-	105-67-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.2	N	U
Dimethylphenol, 2,4-	105-67-9	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.2	N	U
Dimethylphenol, 2,4-	105-67-9	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.2	N	U
Dimethylphenol, 2,4-	105-67-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Dimethylphenol, 2,4-	105-67-9	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Di-n-butyl phthalate	84-74-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Di-n-butyl phthalate	84-74-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Di-n-butyl phthalate	84-74-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Di-n-butyl phthalate	84-74-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Di-n-butyl phthalate	84-74-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Di-n-butyl phthalate	84-74-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	4.75	ug/L	9.5	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	3.8	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	4.95	ug/L	9.9	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	4	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	4.8	ug/L	9.6	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	3.8	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	5	ug/L	10	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	4.1	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dinitro-2-methylphenol, 4,6-	534-52-1	4.8	ug/L	9.6	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	3.8	N	U
Dinitro-2-methylphenol, 4,6-	534-52-1	4.75	ug/L	9.5	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	3.8	N	U
Dinitrobenzene, 1,3-	99-65-0	0.12	ug/L	0.19	J	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.049	N	J
Dinitrobenzene, 1,3-	99-65-0	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.05	N	U
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.049	N	U
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.049	N	U
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.049	N	U
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.049	N	U
Dinitrophenol, 2,4-	51-28-5	12	ug/L	24	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	9.5	N	U
Dinitrophenol, 2,4-	51-28-5	12.5	ug/L	25	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	9.9	N	U
Dinitrophenol, 2,4-	51-28-5	12	ug/L	24	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	9.6	N	U
Dinitrophenol, 2,4-	51-28-5	13	ug/L	26	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	10	N	U
Dinitrophenol, 2,4-	51-28-5	12	ug/L	24	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Dinitrophenol, 2,4-	51-28-5	12	ug/L	24	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	9.5	N	U
Dinitrotoluene, 2,4-	121-14-2	1.7	ug/L	0.19		WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.062	N	
Dinitrotoluene, 2,4-	121-14-2	0.38	ug/L	0.19		WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.062	N	
Dinitrotoluene, 2,4-	121-14-2	0.2	ug/L	0.19		WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.062	N	
Dinitrotoluene, 2,4-	121-14-2	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.064	N	U
Dinitrotoluene, 2,4-	121-14-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.062	N	U
Dinitrotoluene, 2,4-	121-14-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.062	N	U
Dinitrotoluene, 2,4- svoc	121-14-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dinitrotoluene, 2,4- svoc	121-14-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dinitrotoluene, 2,4- svoc	121-14-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dinitrotoluene, 2,4- svoc	121-14-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dinitrotoluene, 2,4- svoc	121-14-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dinitrotoluene, 2,4- svoc	121-14-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Dinitrotoluene, 2,6-	606-20-2	1.7	ug/L	0.19		WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.089	N	
Dinitrotoluene, 2,6-	606-20-2	0.4	ug/L	0.19		WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.089	N	
Dinitrotoluene, 2,6-	606-20-2	0.2	ug/L	0.19		WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.089	N	
Dinitrotoluene, 2,6-	606-20-2	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.091	N	U
Dinitrotoluene, 2,6-	606-20-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.089	N	U
Dinitrotoluene, 2,6-	606-20-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.089	N	U
Dinitrotoluene, 2,6- svoc	606-20-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Dinitrotoluene, 2,6- svoc	606-20-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Dinitrotoluene, 2,6- svoc	606-20-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Dinitrotoluene, 2,6- svoc	606-20-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Dinitrotoluene, 2,6- svoc	606-20-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Dinitrotoluene, 2,6- svoc	606-20-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Di-n-octyl phthalate	117-84-0	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.4	N	U
Di-n-octyl phthalate	117-84-0	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.5	N	U
Di-n-octyl phthalate	117-84-0	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.4	N	U
Di-n-octyl phthalate	117-84-0	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.5	N	U
Di-n-octyl phthalate	117-84-0	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.4	N	U
Di-n-octyl phthalate	117-84-0	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.4	N	U
Ethylbenzene	100-41-4	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.43	N	U
Ethylbenzene	100-41-4	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.43	N	U
Ethylbenzene	100-41-4	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.43	N	U
Ethylbenzene	100-41-4	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.43	N	U
Ethylbenzene	100-41-4	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.43	N	U
Ethylbenzene	100-41-4	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.43	N	U
Fluoranthene	206-44-0	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Fluoranthene	206-44-0	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Fluoranthene	206-44-0	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U

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Fluoranthene	206-44-0	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Fluoranthene	206-44-0	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Fluoranthene	206-44-0	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Fluorene	86-73-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Fluorene	86-73-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Fluorene	86-73-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Fluorene	86-73-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Fluorene	86-73-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Fluorene	86-73-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Hexachlorobenzene	118-74-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Hexachlorobenzene	118-74-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Hexachlorobenzene	118-74-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Hexachlorobenzene	118-74-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Hexachlorobenzene	118-74-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Hexachlorobenzene	118-74-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Hexachlorobutadiene	87-68-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	2.4	N	U
Hexachlorobutadiene	87-68-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2.5	N	U
Hexachlorobutadiene	87-68-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	2.4	N	U
Hexachlorobutadiene	87-68-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2.6	N	U
Hexachlorobutadiene	87-68-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	2.4	N	U
Hexachlorobutadiene	87-68-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	2.4	N	U
Hexachlorocyclopentadiene	77-47-4	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.2	N	U
Hexachlorocyclopentadiene	77-47-4	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.3	N	U
Hexachlorocyclopentadiene	77-47-4	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.2	N	U
Hexachlorocyclopentadiene	77-47-4	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.3	N	U
Hexachlorocyclopentadiene	77-47-4	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Hexachlorocyclopentadiene	77-47-4	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.2	N	U
Hexachloroethane	67-72-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	2.4	N	U
Hexachloroethane	67-72-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2.5	N	U
Hexachloroethane	67-72-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	2.4	N	U
Hexachloroethane	67-72-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2.6	N	U
Hexachloroethane	67-72-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	2.4	N	U
Hexachloroethane	67-72-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	2.4	N	U
Hexanone, 2-	591-78-6	5	ug/L	10	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	5	N	U
Hexanone, 2-	591-78-6	5	ug/L	10	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	5	N	U
Hexanone, 2-	591-78-6	5	ug/L	10	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	5	N	U
Hexanone, 2-	591-78-6	5	ug/L	10	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	5	N	U
Hexanone, 2-	591-78-6	5	ug/L	10	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	5	N	U
Hexanone, 2-	591-78-6	5	ug/L	10	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	5	N	U
HMX	2691-41-0	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.1	N	U
HMX	2691-41-0	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.11	N	U
HMX	2691-41-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.1	N	U
HMX	2691-41-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.1	N	U
HMX	2691-41-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.1	N	U
HMX	2691-41-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.1	N	U
Indeno(1,2,3-cd)pyrene	193-39-5	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Iron	7439-89-6	473	ug/L	300		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	23	N	
Iron	7439-89-6	892	ug/L	300		WTP1-MW02	WW3016	METALS	REG	8-May-09	23	N	

Table E-4
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Iron	7439-89-6	1690	ug/L	300		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	23	N	
Iron	7439-89-6	551	ug/L	300		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	23	N	
Iron	7439-89-6	123	ug/L	300	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	23	N	B
Iron	7439-89-6	150	ug/L	300	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	23	N	U
Isophorone	78-59-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Isophorone	78-59-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Isophorone	78-59-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Isophorone	78-59-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Isophorone	78-59-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Isophorone	78-59-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Lead	7439-92-1	2.8	ug/L	5	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	2	N	B
Lead	7439-92-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	2	N	U
Lead	7439-92-1	2.5	ug/L	5	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	2	N	U
Magnesium	7439-95-4	20900	ug/L	5000		WTP1-MW01	WW3015	METALS	REG	7-May-09	100	N	
Magnesium	7439-95-4	22600	ug/L	5000		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	100	N	
Magnesium	7439-95-4	8560	ug/L	5000		WTP1-MW02	WW3016	METALS	REG	8-May-09	100	N	
Magnesium	7439-95-4	10500	ug/L	5000		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	100	N	
Magnesium	7439-95-4	9800	ug/L	5000		WTP1-MW03	WW3017	METALS	REG	9-May-09	100	N	
Magnesium	7439-95-4	11000	ug/L	5000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	100	N	
Manganese	7439-96-5	564	ug/L	15		WTP1-MW01	WW3015	METALS	REG	7-May-09	0.5	N	
Manganese	7439-96-5	384	ug/L	15		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.5	N	
Manganese	7439-96-5	98.9	ug/L	15		WTP1-MW02	WW3016	METALS	REG	8-May-09	0.5	N	
Manganese	7439-96-5	109	ug/L	15		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.5	N	
Manganese	7439-96-5	39.5	ug/L	15		WTP1-MW03	WW3017	METALS	REG	9-May-09	0.5	N	
Manganese	7439-96-5	105	ug/L	15		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.5	N	
Mercury	7439-97-6	0.15	ug/L	1	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	0.14	N	B
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.14	N	U
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	0.14	N	U
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.14	N	U
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	0.14	N	U
Mercury	7439-97-6	0.5	ug/L	1	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.14	N	U
Methyl-2-pentanone, 4-	108-10-1	2.5	ug/L	5	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	2	N	U
Methyl-2-pentanone, 4-	108-10-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	2	N	U
Methyl-2-pentanone, 4-	108-10-1	2.5	ug/L	5	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	2	N	U
Methyl-2-pentanone, 4-	108-10-1	2.5	ug/L	5	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	2	N	U
Methyl-2-pentanone, 4-	108-10-1	2.5	ug/L	5	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	2	N	U
Methyl-2-pentanone, 4-	108-10-1	2.5	ug/L	5	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	2	N	U
Methylene chloride	75-09-2	2.5	ug/L	5	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	1	N	U
Methylene chloride	75-09-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	1	N	U
Methylene chloride	75-09-2	2.5	ug/L	5	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	1	N	U
Methylene chloride	75-09-2	2.5	ug/L	5	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	1	N	U
Methylene chloride	75-09-2	2.5	ug/L	5	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	1	N	U
Methylene chloride	75-09-2	2.5	ug/L	5	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	1	N	U
Methylnaphthalene, 2-	91-57-6	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Methylnaphthalene, 2-	91-57-6	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Methylnaphthalene, 2-	91-57-6	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Methylnaphthalene, 2-	91-57-6	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Methylnaphthalene, 2-	91-57-6	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Methylnaphthalene, 2-	91-57-6	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Methylphenol, 2-	95-48-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Methylphenol, 2-	95-48-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Methylphenol, 2-	95-48-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Methylphenol, 2-	95-48-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Methylphenol, 2-	95-48-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Methylphenol, 2-	95-48-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Naphthalene	91-20-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Naphthalene	91-20-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Naphthalene	91-20-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Naphthalene	91-20-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Naphthalene	91-20-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Naphthalene	91-20-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Nickel	7440-02-0	2.9	ug/L	40	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	2.3	N	B
Nickel	7440-02-0	3	ug/L	40	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	2.3	N	B
Nickel	7440-02-0	4.5	ug/L	40	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	2.3	N	B
Nickel	7440-02-0	3.4	ug/L	40	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	2.3	N	B
Nickel	7440-02-0	20	ug/L	40	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	2.3	N	U
Nickel	7440-02-0	20	ug/L	40	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	2.3	N	U
Nitrate-Nitrite	10-28-6	50	ug/L	100	U	WTP1-MW01	WW3015	GEN CHEMISTRY	REG	7-May-09	37	N	U
Nitrate-Nitrite	10-28-6	48	ug/L	100	J	WTP1-MW02	WW3016	GEN CHEMISTRY	REG	8-May-09	37	N	B
Nitrate-Nitrite	10-28-6	1000	ug/L	2000	U	WTP1-MW03	WW3017	GEN CHEMISTRY	REG	9-May-09	740	N	U
Nitrate-Nitrite	10-28-6	50	ug/L	100	U	WTP1-MW01	WW3027A	GEN CHEMISTRY	REG	28-Oct-09	30	N	U
Nitrate-Nitrite	10-28-6	50	ug/L	100	U	WTP1-MW02	WW3028A	GEN CHEMISTRY	REG	29-Oct-09	30	N	U
Nitrate-Nitrite	10-28-6	140	ug/L	100		WTP1-MW03	WW3029	GEN CHEMISTRY	REG	29-Oct-09	30	N	
Nitroaniline, 2-	88-74-4	4.75	ug/L	9.5	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
Nitroaniline, 2-	88-74-4	4.95	ug/L	9.9	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	U
Nitroaniline, 2-	88-74-4	4.8	ug/L	9.6	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
Nitroaniline, 2-	88-74-4	5	ug/L	10	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
Nitroaniline, 2-	88-74-4	4.8	ug/L	9.6	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Nitroaniline, 2-	88-74-4	4.75	ug/L	9.5	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Nitroaniline, 3-	99-09-2	4.75	ug/L	9.5	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
Nitroaniline, 3-	99-09-2	4.95	ug/L	9.9	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	U
Nitroaniline, 3-	99-09-2	4.8	ug/L	9.6	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
Nitroaniline, 3-	99-09-2	5	ug/L	10	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
Nitroaniline, 3-	99-09-2	4.8	ug/L	9.6	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Nitroaniline, 3-	99-09-2	4.75	ug/L	9.5	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Nitroaniline, 4-	100-01-6	4.75	ug/L	9.5	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
Nitroaniline, 4-	100-01-6	4.95	ug/L	9.9	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	U
Nitroaniline, 4-	100-01-6	4.8	ug/L	9.6	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
Nitroaniline, 4-	100-01-6	5	ug/L	10	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
Nitroaniline, 4-	100-01-6	4.8	ug/L	9.6	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
Nitroaniline, 4-	100-01-6	4.75	ug/L	9.5	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.048	N	U
Nitrobenzene	98-95-3	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.049	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.048	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.048	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.048	N	U
Nitrobenzene	98-95-3	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.048	N	U
Nitrobenzene	98-95-3	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Nitrobenzene	98-95-3	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Nitrobenzene	98-95-3	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Nitrobenzene	98-95-3	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Nitrobenzene	98-95-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Nitrobenzene	98-95-3	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Nitrophenol, 2-	88-75-5	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.2	N	U
Nitrophenol, 2-	88-75-5	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.3	N	U
Nitrophenol, 2-	88-75-5	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.2	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrophenol, 2-	88-75-5	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.3	N	U
Nitrophenol, 2-	88-75-5	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.2	N	U
Nitrophenol, 2-	88-75-5	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.2	N	U
Nitrophenol, 4-	100-02-7	12	ug/L	24	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	9.5	N	U
Nitrophenol, 4-	100-02-7	12.5	ug/L	25	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	9.9	N	U
Nitrophenol, 4-	100-02-7	12	ug/L	24	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	9.6	N	U
Nitrophenol, 4-	100-02-7	13	ug/L	26	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	10	N	U
Nitrophenol, 4-	100-02-7	12	ug/L	24	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Nitrophenol, 4-	100-02-7	12	ug/L	24	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	9.5	N	U
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.062	N	U
Nitrotoluene, 2-	88-72-2	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.063	N	U
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.061	N	U
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.061	N	U
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.062	N	U
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.061	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.093	N	U
Nitrotoluene, 3-	99-08-1	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.095	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.092	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.092	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.093	N	U
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.092	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.073	N	U
Nitrotoluene, 4-	99-99-0	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.075	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.072	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.072	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.073	N	U
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.072	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
n-Nitroso-di-n-propylamine	621-64-7	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
n-Nitrosodiphenylamine	86-30-6	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.9	N	U
n-Nitrosodiphenylamine	86-30-6	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	2	N	U
n-Nitrosodiphenylamine	86-30-6	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.9	N	U
n-Nitrosodiphenylamine	86-30-6	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	2	N	U
n-Nitrosodiphenylamine	86-30-6	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.9	N	U
n-Nitrosodiphenylamine	86-30-6	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.9	N	U
Pentachlorophenol	87-86-5	12	ug/L	24	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	9.5	N	U
Pentachlorophenol	87-86-5	12	ug/L	24	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	9.6	N	U
Pentachlorophenol	87-86-5	13	ug/L	26	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	10	N	U
Pentachlorophenol	87-86-5	12	ug/L	24	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	9.6	N	U
Pentachlorophenol	87-86-5	12	ug/L	24	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	9.5	N	U
Pentachlorophenol	87-86-5	12.5	ug/L	25	UJ	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	9.9	N	U
Phenanthrene	85-01-8	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Phenanthrene	85-01-8	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Phenanthrene	85-01-8	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Phenanthrene	85-01-8	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Phenanthrene	85-01-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Phenanthrene	85-01-8	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Phenol	108-95-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Phenol	108-95-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Phenol	108-95-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Phenol	108-95-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Phenol	108-95-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Phenol	108-95-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Potassium	7440-09-7	18500	ug/L	10000		WTP1-MW03	WW3017	METALS	REG	9-May-09	100	N	
Potassium	7440-09-7	4360	ug/L	10000	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	100	N	B
Potassium	7440-09-7	6490	ug/L	10000	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	100	N	B
Potassium	7440-09-7	6380	ug/L	10000	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	100	N	B
Potassium	7440-09-7	8790	ug/L	10000	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	100	N	B
Potassium	7440-09-7	13800	ug/L	10000	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	100	N	
Pyrene	129-00-0	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Pyrene	129-00-0	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Pyrene	129-00-0	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Pyrene	129-00-0	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Pyrene	129-00-0	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Pyrene	129-00-0	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
RDX	121-82-4	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.072	N	U
RDX	121-82-4	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.074	N	U
RDX	121-82-4	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.071	N	U
RDX	121-82-4	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.071	N	U
RDX	121-82-4	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.072	N	U
RDX	121-82-4	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.071	N	U
Selenium	7782-49-2	7.4	ug/L	10	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.1	N	B
Selenium	7782-49-2	6.9	ug/L	10	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.1	N	B
Selenium	7782-49-2	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.1	N	U
Selenium	7782-49-2	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.1	N	U
Selenium	7782-49-2	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.1	N	U
Selenium	7782-49-2	10	ug/L	20	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.1	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1.2	N	U
Silver	7440-22-4	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1.2	N	U
Sodium	7440-23-5	16800	ug/L	10000		WTP1-MW01	WW3015	METALS	REG	7-May-09	500	N	
Sodium	7440-23-5	34100	ug/L	10000		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	500	N	
Sodium	7440-23-5	118000	ug/L	20000		WTP1-MW02	WW3016	METALS	REG	8-May-09	1000	N	
Sodium	7440-23-5	107000	ug/L	20000		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1000	N	
Sodium	7440-23-5	91400	ug/L	20000		WTP1-MW03	WW3017	METALS	REG	9-May-09	1000	N	
Sodium	7440-23-5	101000	ug/L	20000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1000	N	
Styrene	100-42-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.36	N	U
Styrene	100-42-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.36	N	U
Styrene	100-42-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.36	N	U
Styrene	100-42-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.36	N	U
Styrene	100-42-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.36	N	U
Styrene	100-42-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.36	N	U
Sulfate	14808-79-8	62800	ug/L	2000		WTP1-MW01	WW3015	GEN CHEMISTRY	REG	7-May-09	1000	N	
Sulfate	14808-79-8	93300	ug/L	4000		WTP1-MW02	WW3016	GEN CHEMISTRY	REG	8-May-09	2000	N	
Sulfate	14808-79-8	35800	ug/L	2000		WTP1-MW03	WW3017	GEN CHEMISTRY	REG	9-May-09	1000	N	
Sulfate	14808-79-8	70400	ug/L	2000		WTP1-MW01	WW3027A	GEN CHEMISTRY	REG	28-Oct-09	1000	N	
Sulfate	14808-79-8	83100	ug/L	2000		WTP1-MW02	WW3028A	GEN CHEMISTRY	REG	29-Oct-09	1000	N	
Sulfate	14808-79-8	39900	ug/L	2000		WTP1-MW03	WW3029	GEN CHEMISTRY	REG	29-Oct-09	1000	N	
Tetrachloroethane, 1,1,2,2-	79-34-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.21	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Tetrachloroethane, 1,1,2,2-	79-34-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.21	N	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.21	N	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.21	N	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.21	N	U
Tetrachloroethane, 1,1,2,2-	79-34-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.21	N	U
Tetrachloroethene	127-18-4	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.22	N	U
Tetrachloroethene	127-18-4	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.22	N	U
Tetrachloroethene	127-18-4	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.22	N	U
Tetrachloroethene	127-18-4	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.22	N	U
Tetrachloroethene	127-18-4	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.22	N	U
Tetrachloroethene	127-18-4	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.22	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.075	N	U
Tetryl	479-45-8	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.076	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.074	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.074	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.075	N	U
Tetryl	479-45-8	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.074	N	U
Thallium	7440-28-0	10	ug/L	20	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.4	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.4	N	U
Thallium	7440-28-0	10	ug/L	20	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.4	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.4	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.4	N	U
Thallium	7440-28-0	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.4	N	U
Toluene	108-88-3	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.35	N	U
Toluene	108-88-3	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.35	N	U
Toluene	108-88-3	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.35	N	U
Toluene	108-88-3	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.35	N	U
Toluene	108-88-3	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.35	N	U
Toluene	108-88-3	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.35	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	0.95	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	0.99	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	0.96	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	0.96	N	U
Trichlorobenzene, 1,2,4-	120-82-1	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	0.95	N	U
Trichloroethane, 1,1,1-	71-55-6	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.33	N	U
Trichloroethane, 1,1,1-	71-55-6	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.33	N	U
Trichloroethane, 1,1,1-	71-55-6	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.33	N	U
Trichloroethane, 1,1,1-	71-55-6	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.33	N	U
Trichloroethane, 1,1,1-	71-55-6	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.33	N	U
Trichloroethane, 1,1,1-	71-55-6	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.33	N	U
Trichloroethane, 1,1,2-	79-00-5	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.26	N	U
Trichloroethane, 1,1,2-	79-00-5	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.26	N	U
Trichloroethane, 1,1,2-	79-00-5	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.26	N	U
Trichloroethane, 1,1,2-	79-00-5	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.26	N	U
Trichloroethane, 1,1,2-	79-00-5	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.26	N	U
Trichloroethane, 1,1,2-	79-00-5	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.26	N	U
Trichloroethene	79-01-6	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.32	N	U
Trichloroethene	79-01-6	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.32	N	U
Trichloroethene	79-01-6	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.32	N	U
Trichloroethene	79-01-6	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.32	N	U
Trichloroethene	79-01-6	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.32	N	U
Trichloroethene	79-01-6	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.32	N	U

Table E-4
Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trichlorophenol, 2,4,5-	95-95-4	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.3	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.4	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.3	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.4	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.3	N	U
Trichlorophenol, 2,4,5-	95-95-4	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.3	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.4	ug/L	4.8	U	WTP1-MW01	WW3015	SEMIVOLATILES	REG	7-May-09	1.3	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.5	ug/L	5	U	WTP1-MW01	WW3027A	SEMIVOLATILES	REG	28-Oct-09	1.4	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.4	ug/L	4.8	U	WTP1-MW02	WW3016	SEMIVOLATILES	REG	8-May-09	1.3	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.55	ug/L	5.1	U	WTP1-MW02	WW3028A	SEMIVOLATILES	REG	29-Oct-09	1.4	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3017	SEMIVOLATILES	REG	9-May-09	1.3	N	U
Trichlorophenol, 2,4,6-	88-06-2	2.4	ug/L	4.8	U	WTP1-MW03	WW3029	SEMIVOLATILES	REG	29-Oct-09	1.3	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	U	WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.048	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.049	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.048	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.048	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.048	N	U
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.048	N	U
Trinitrotoluene, 2,4,6-	118-96-7	1.7	ug/L	0.19		WTP1-MW01	WW3015	EXPLOSIVES	REG	7-May-09	0.066	N	
Trinitrotoluene, 2,4,6-	118-96-7	0.1	ug/L	0.2	U	WTP1-MW01	WW3027A	EXPLOSIVES	REG	28-Oct-09	0.068	N	U
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	U	WTP1-MW02	WW3016	EXPLOSIVES	REG	8-May-09	0.066	N	U
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	U	WTP1-MW02	WW3028A	EXPLOSIVES	REG	29-Oct-09	0.066	N	U
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	U	WTP1-MW03	WW3017	EXPLOSIVES	REG	9-May-09	0.066	N	U
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	U	WTP1-MW03	WW3029	EXPLOSIVES	REG	29-Oct-09	0.066	N	U
Vanadium	7440-62-2	2.5	ug/L	50	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	0.66	N	B
Vanadium	7440-62-2	4.2	ug/L	50	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.66	N	B
Vanadium	7440-62-2	2	ug/L	50	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	0.66	N	B
Vanadium	7440-62-2	2.3	ug/L	50	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.66	N	B
Vanadium	7440-62-2	25	ug/L	50	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	0.66	N	U
Vanadium	7440-62-2	25	ug/L	50	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.66	N	U
Vinyl chloride	75-01-4	0.5	ug/L	1	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	0.3	N	U
Vinyl chloride	75-01-4	0.5	ug/L	1	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	0.3	N	U
Vinyl chloride	75-01-4	0.5	ug/L	1	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	0.3	N	U
Vinyl chloride	75-01-4	0.5	ug/L	1	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	0.3	N	U
Vinyl chloride	75-01-4	0.5	ug/L	1	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	0.3	N	U
Vinyl chloride	75-01-4	0.5	ug/L	1	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	0.3	N	U
Xylenes, total	1330-20-7	1.5	ug/L	3	U	WTP1-MW01	WW3015	VOLATILES	REG	7-May-09	1.2	N	U
Xylenes, total	1330-20-7	1.5	ug/L	3	U	WTP1-MW01	WW3027A	VOLATILES	REG	28-Oct-09	1.2	N	U
Xylenes, total	1330-20-7	1.5	ug/L	3	U	WTP1-MW02	WW3016	VOLATILES	REG	8-May-09	1.2	N	U
Xylenes, total	1330-20-7	1.5	ug/L	3	U	WTP1-MW02	WW3028A	VOLATILES	REG	29-Oct-09	1.2	N	U
Xylenes, total	1330-20-7	1.5	ug/L	3	U	WTP1-MW03	WW3017	VOLATILES	REG	9-May-09	1.2	N	U
Xylenes, total	1330-20-7	1.5	ug/L	3	U	WTP1-MW03	WW3029	VOLATILES	REG	29-Oct-09	1.2	N	U
Zinc	7440-66-6	11.1	ug/L	20	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.8	N	B
Zinc	7440-66-6	10	ug/L	20	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.8	N	U
Zinc	7440-66-6	10	ug/L	20	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.8	N	U
Aluminum-fil	7429-90-5	100	ug/L	200	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	11	Y	U
Aluminum-fil	7429-90-5	100	ug/L	200	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	11	Y	U
Aluminum-fil	7429-90-5	100	ug/L	200	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	11	Y	U
Aluminum-fil	7429-90-5	100	ug/L	200	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	11	Y	U
Aluminum-fil	7429-90-5	100	ug/L	200	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	11	Y	U
Aluminum-fil	7429-90-5	15.2	ug/L	200	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	11	Y	B
Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	4.5	Y	U
Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	4.5	Y	U

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Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	4.5	Y	U
Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	4.5	Y	U
Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	4.5	Y	U
Antimony-fil	7440-36-0	3	ug/L	6	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	4.5	Y	U
Arsenic-fil	7440-38-2	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.6	Y	U
Arsenic-fil	7440-38-2	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.6	Y	U
Arsenic-fil	7440-38-2	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.6	Y	U
Arsenic-fil	7440-38-2	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.6	Y	U
Arsenic-fil	7440-38-2	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.6	Y	U
Arsenic-fil	7440-38-2	6.8	ug/L	10	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.6	Y	B
Barium-fil	7440-39-3	80.6	ug/L	200	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	5	Y	B
Barium-fil	7440-39-3	156	ug/L	200	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	5	Y	B
Barium-fil	7440-39-3	59	ug/L	200	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	5	Y	B
Barium-fil	7440-39-3	103	ug/L	200	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	5	Y	B
Barium-fil	7440-39-3	85.8	ug/L	200	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	5	Y	B
Barium-fil	7440-39-3	126	ug/L	200	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	5	Y	B
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1	Y	U
Beryllium-fil	7440-41-7	2	ug/L	4	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1	Y	U
Cadmium-fil	7440-43-9	2.5	ug/L	5	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1	Y	U
Calcium-fil	7440-70-2	88500	ug/L	1000		WTP1-MW01	WW3015	METALS	REG	7-May-09	100	Y	
Calcium-fil	7440-70-2	76100	ug/L	1000		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	100	Y	
Calcium-fil	7440-70-2	26900	ug/L	1000		WTP1-MW02	WW3016	METALS	REG	8-May-09	100	Y	
Calcium-fil	7440-70-2	26900	ug/L	1000		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	100	Y	
Calcium-fil	7440-70-2	29700	ug/L	1000		WTP1-MW03	WW3017	METALS	REG	9-May-09	100	Y	
Calcium-fil	7440-70-2	31400	ug/L	1000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	100	Y	
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1.6	Y	U
Chromium-fil	7440-47-3	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1.6	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	0.83	Y	U
Cobalt-fil	7440-48-4	25	ug/L	50	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.83	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	2.1	Y	U
Copper-fil	7440-50-8	12.5	ug/L	25	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	2.1	Y	U
Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	23	Y	U

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Overburden Groundwater Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	23	Y	U
Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	23	Y	U
Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	23	Y	U
Iron-fil	7439-89-6	150	ug/L	300	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	23	Y	U
Iron-fil	7439-89-6	80.9	ug/L	300	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	23	Y	B
Lead-fil	7439-92-1	2.5	ug/L	5	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	2	Y	U
Lead-fil	7439-92-1	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	2	Y	U
Lead-fil	7439-92-1	2.5	ug/L	5	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	2	Y	U
Lead-fil	7439-92-1	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	2	Y	U
Lead-fil	7439-92-1	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	2	Y	U
Lead-fil	7439-92-1	2.5	ug/L	10	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	2	Y	B
Magnesium-fil	7439-95-4	20800	ug/L	5000		WTP1-MW01	WW3015	METALS	REG	7-May-09	100	Y	
Magnesium-fil	7439-95-4	23200	ug/L	5000		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	100	Y	
Magnesium-fil	7439-95-4	8070	ug/L	5000		WTP1-MW02	WW3016	METALS	REG	8-May-09	100	Y	
Magnesium-fil	7439-95-4	8920	ug/L	5000		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	100	Y	
Magnesium-fil	7439-95-4	9780	ug/L	5000		WTP1-MW03	WW3017	METALS	REG	9-May-09	100	Y	
Magnesium-fil	7439-95-4	9940	ug/L	5000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	100	Y	
Manganese-fil	7439-96-5	550	ug/L	15		WTP1-MW01	WW3015	METALS	REG	7-May-09	0.5	Y	
Manganese-fil	7439-96-5	390	ug/L	15		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.5	Y	
Manganese-fil	7439-96-5	77.2	ug/L	15		WTP1-MW02	WW3016	METALS	REG	8-May-09	0.5	Y	
Manganese-fil	7439-96-5	59.3	ug/L	15		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.5	Y	
Manganese-fil	7439-96-5	20.7	ug/L	15		WTP1-MW03	WW3017	METALS	REG	9-May-09	0.5	Y	
Manganese-fil	7439-96-5	85.7	ug/L	15		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.5	Y	
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	0.14	Y	U
Mercury-fil	7439-97-6	0.5	ug/L	1	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.14	Y	U
Nickel-fil	7440-02-0	20	ug/L	40	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	2.3	Y	U
Nickel-fil	7440-02-0	3.3	ug/L	40	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	2.3	Y	B
Nickel-fil	7440-02-0	2.3	ug/L	40	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	2.3	Y	B
Nickel-fil	7440-02-0	3	ug/L	40	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	2.3	Y	B
Nickel-fil	7440-02-0	2.3	ug/L	40	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	2.3	Y	B
Nickel-fil	7440-02-0	3.1	ug/L	40	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	2.3	Y	B
Potassium-fil	7440-09-7	19700	ug/L	10000		WTP1-MW03	WW3017	METALS	REG	9-May-09	100	Y	
Potassium-fil	7440-09-7	14100	ug/L	10000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	100	Y	
Potassium-fil	7440-09-7	4020	ug/L	10000	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	100	Y	B
Potassium-fil	7440-09-7	7200	ug/L	10000	J	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	100	Y	B
Potassium-fil	7440-09-7	6020	ug/L	10000	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	100	Y	B
Potassium-fil	7440-09-7	9750	ug/L	10000	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	100	Y	B
Selenium-fil	7782-49-2	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.1	Y	U
Selenium-fil	7782-49-2	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.1	Y	U
Selenium-fil	7782-49-2	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.1	Y	U
Selenium-fil	7782-49-2	10	ug/L	20	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.1	Y	U
Selenium-fil	7782-49-2	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.1	Y	U
Selenium-fil	7782-49-2	3.4	ug/L	10	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.1	Y	B
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	1.2	Y	U
Silver-fil	7440-22-4	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1.2	Y	U

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Sodium-fil	7440-23-5	14400	ug/L	10000		WTP1-MW01	WW3015	METALS	REG	7-May-09	500	Y		
Sodium-fil	7440-23-5	33700	ug/L	10000		WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	500	Y		
Sodium-fil	7440-23-5	114000	ug/L	20000		WTP1-MW02	WW3016	METALS	REG	8-May-09	1000	Y		
Sodium-fil	7440-23-5	104000	ug/L	20000		WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	1000	Y		
Sodium-fil	7440-23-5	99300	ug/L	20000		WTP1-MW03	WW3017	METALS	REG	9-May-09	1000	Y		
Sodium-fil	7440-23-5	99000	ug/L	20000		WTP1-MW03	WW3029	METALS	REG	29-Oct-09	1000	Y		
Thallium-fil	7440-28-0	10	ug/L	20	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.4	Y		U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.4	Y		U
Thallium-fil	7440-28-0	10	ug/L	20	U	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.4	Y		U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.4	Y		U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.4	Y		U
Thallium-fil	7440-28-0	5	ug/L	10	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.4	Y		U
Vanadium-fil	7440-62-2	1	ug/L	50	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	0.66	Y		B
Vanadium-fil	7440-62-2	2	ug/L	50	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	0.66	Y		B
Vanadium-fil	7440-62-2	25	ug/L	50	U	WTP1-MW01	WW3015	METALS	REG	7-May-09	0.66	Y		U
Vanadium-fil	7440-62-2	25	ug/L	50	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	0.66	Y		U
Vanadium-fil	7440-62-2	25	ug/L	50	U	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	0.66	Y		U
Vanadium-fil	7440-62-2	1.3	ug/L	50	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	0.66	Y		B
Zinc-fil	7440-66-6	10.9	ug/L	20	J	WTP1-MW01	WW3015	METALS	REG	7-May-09	3.8	Y		B
Zinc-fil	7440-66-6	11.3	ug/L	20	J	WTP1-MW02	WW3016	METALS	REG	8-May-09	3.8	Y		B
Zinc-fil	7440-66-6	9.5	ug/L	20	J	WTP1-MW02	WW3028A	METALS	REG	29-Oct-09	3.8	Y		B
Zinc-fil	7440-66-6	9.7	ug/L	20	J	WTP1-MW03	WW3017	METALS	REG	9-May-09	3.8	Y		B
Zinc-fil	7440-66-6	10.1	ug/L	20	J	WTP1-MW03	WW3029	METALS	REG	29-Oct-09	3.8	Y		B
Zinc-fil	7440-66-6	10	ug/L	20	U	WTP1-MW01	WW3027A	METALS	REG	28-Oct-09	3.8	Y		U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

PARAMETER	CASNUM	RES	UNIT	DETLIMIT	VQUAL	LOCATION_CODE	SAMPLE_NO	USER_TEST_PANEL	PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METH_DET_LIM	LAB_QUAL
Acenaphthene	83-32-9	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41	U
Acenaphthene	83-32-9	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43	U
Acenaphthene	83-32-9	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4	U
Acenaphthene	83-32-9	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39	UU
Acenaphthylene	208-96-8	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41	U
Acenaphthylene	208-96-8	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43	U
Acenaphthylene	208-96-8	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4	U
Acenaphthylene	208-96-8	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39	UU
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25	U
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25	UU
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25	U
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25	UU
Anthracene	120-12-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41	U
Anthracene	120-12-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43	U
Anthracene	120-12-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4	U
Anthracene	120-12-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39	UU
Aroclor 1016	12674-11-2	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.03	U
Aroclor 1016	12674-11-2	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.021	U
Aroclor 1016	12674-11-2	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1016	12674-11-2	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1221	11104-28-2	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.048	U
Aroclor 1221	11104-28-2	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.033	U
Aroclor 1221	11104-28-2	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.018	U
Aroclor 1221	11104-28-2	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.017	U
Aroclor 1232	11141-16-5	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.048	U
Aroclor 1232	11141-16-5	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.033	U
Aroclor 1232	11141-16-5	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.018	U
Aroclor 1232	11141-16-5	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.017	U
Aroclor 1242	53469-21-9	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.03	U
Aroclor 1242	53469-21-9	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.021	U
Aroclor 1242	53469-21-9	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1242	53469-21-9	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1248	12672-29-6	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.03	U
Aroclor 1248	12672-29-6	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.021	U
Aroclor 1248	12672-29-6	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1248	12672-29-6	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1254	11097-69-1	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.03	U
Aroclor 1254	11097-69-1	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.021	U
Aroclor 1254	11097-69-1	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1254	11097-69-1	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1260	11096-82-5	0.03	mg/kg	0.06	U	WWTP1-SD01	WW1000	PEST/PCB	REG	21-May-09	0	0.5	0.03	U
Aroclor 1260	11096-82-5	0.021	mg/kg	0.042	U	WWTP1-SD02	WW1001	PEST/PCB	REG	21-May-09	0	0.5	0.021	U
Aroclor 1260	11096-82-5	0.011	mg/kg	0.022	U	WWTP1-SD03	WW1002	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Aroclor 1260	11096-82-5	0.0105	mg/kg	0.021	U	WWTP1-SD04	WW1003	PEST/PCB	REG	20-May-09	0	0.5	0.011	U
Arsenic	7440-38-2	3.7	mg/kg	1.2		PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	1.2	
Arsenic	7440-38-2	11	mg/kg	1.3		PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	1.3	
Arsenic	7440-38-2	12.2	mg/kg	1.2		PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	1.2	
Arsenic	7440-38-2	5.65	mg/kg	1.2		PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	1.2	
Barium	7440-39-3	12.4	mg/kg	24.8	U	PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	24.8	U
Barium	7440-39-3	47.4	mg/kg	25.8		PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	25.8	
Barium	7440-39-3	28.1	mg/kg	24.2		PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	24.2	
Barium	7440-39-3	25.5	mg/kg	23.75	/U	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	23.75	U
Benzo(a)anthracene	56-55-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41	U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Benzo(a)anthracene	56-55-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Benzo(a)anthracene	56-55-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Benzo(a)anthracene	56-55-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Benzo(a)pyrene	50-32-8	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Benzo(a)pyrene	50-32-8	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Benzo(a)pyrene	50-32-8	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Benzo(a)pyrene	50-32-8	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Benzo(b)fluoranthene	205-99-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Benzo(b)fluoranthene	205-99-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Benzo(b)fluoranthene	205-99-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Benzo(b)fluoranthene	205-99-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Benzo(ghi)perylene	191-24-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Benzo(ghi)perylene	191-24-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Benzo(ghi)perylene	191-24-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Benzo(ghi)perylene	191-24-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Benzo(k)fluoranthene	207-08-9	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Benzo(k)fluoranthene	207-08-9	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Benzo(k)fluoranthene	207-08-9	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Benzo(k)fluoranthene	207-08-9	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Bis(2-chloroethoxy)methane	111-91-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Bis(2-chloroethoxy)methane	111-91-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Bis(2-chloroethoxy)methane	111-91-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Bis(2-chloroethoxy)methane	111-91-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Bis(2-chloroethyl)ether	111-44-4	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Bis(2-chloroethyl)ether	111-44-4	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Bis(2-chloroethyl)ether	111-44-4	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Bis(2-chloroethyl)ether	111-44-4	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Bis(2-chloroisopropyl)ether	108-60-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Bis(2-chloroisopropyl)ether	108-60-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Bis(2-chloroisopropyl)ether	108-60-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Bis(2-chloroisopropyl)ether	108-60-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Bis(2-ethylhexyl)phthalate	117-81-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Bromophenyl phenyl ether, 4-	101-55-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Bromophenyl phenyl ether, 4-	101-55-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Bromophenyl phenyl ether, 4-	101-55-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Bromophenyl phenyl ether, 4-	101-55-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Butyl benzyl phthalate	85-68-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Butyl benzyl phthalate	85-68-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Butyl benzyl phthalate	85-68-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Butyl benzyl phthalate	85-68-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Cadmium	7440-43-9	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	0.25 U
Cadmium	7440-43-9	0.26	mg/kg	0.26		PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	0.26
Cadmium	7440-43-9	0.12	mg/kg	0.24	U	PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	0.24 U
Cadmium	7440-43-9	0.1175	mg/kg	0.235	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	0.235 UU
Carbazole	86-74-8	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Carbazole	86-74-8	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Carbazole	86-74-8	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Carbazole	86-74-8	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Chloro-3-methylphenol, 4-	59-50-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Chloro-3-methylphenol, 4-	59-50-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Chloro-3-methylphenol, 4-	59-50-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Chloro-3-methylphenol, 4-	59-50-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Chloroaniline, 4-	106-47-8	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Chloroaniline, 4-	106-47-8	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Chloroaniline, 4-	106-47-8	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Chloroaniline, 4-	106-47-8	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Chloronaphthalene, 2-	91-58-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Chloronaphthalene, 2-	91-58-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Chloronaphthalene, 2-	91-58-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Chloronaphthalene, 2-	91-58-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Chlorophenol, 2-	95-57-8	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Chlorophenol, 2-	95-57-8	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Chlorophenol, 2-	95-57-8	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Chlorophenol, 2-	95-57-8	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Chlorophenyl phenyl ether, 4-	7005-72-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Chlorophenyl phenyl ether, 4-	7005-72-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Chromium	7440-47-3	8.2	mg/kg	0.62		PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	0.62
Chromium	7440-47-3	14	mg/kg	0.64		PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	0.64
Chromium	7440-47-3	13.9	mg/kg	0.6		PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	0.6
Chromium	7440-47-3	13.65	mg/kg	0.595		PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	0.595
Chrysene	218-01-9	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Chrysene	218-01-9	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Chrysene	218-01-9	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Chrysene	218-01-9	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dibenz(a,h)anthracene	53-70-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dibenz(a,h)anthracene	53-70-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dibenz(a,h)anthracene	53-70-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dibenz(a,h)anthracene	53-70-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dibenzofuran	132-64-9	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dibenzofuran	132-64-9	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dibenzofuran	132-64-9	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dibenzofuran	132-64-9	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dichlorobenzene, 1,2-	95-50-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dichlorobenzene, 1,2-	95-50-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dichlorobenzene, 1,2-	95-50-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dichlorobenzene, 1,2-	95-50-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dichlorobenzene, 1,3-	541-73-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dichlorobenzene, 1,3-	541-73-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dichlorobenzene, 1,3-	541-73-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dichlorobenzene, 1,3-	541-73-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dichlorobenzene, 1,4-	106-46-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dichlorobenzene, 1,4-	106-46-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dichlorobenzene, 1,4-	106-46-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dichlorobenzene, 1,4-	106-46-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dichlorobenzidine, 3,3'-	91-94-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dichlorobenzidine, 3,3'-	91-94-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dichlorobenzidine, 3,3'-	91-94-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dichlorobenzidine, 3,3'-	91-94-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dichlorophenol, 2,4-	120-83-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dichlorophenol, 2,4-	120-83-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dichlorophenol, 2,4-	120-83-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dichlorophenol, 2,4-	120-83-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Diethyl phthalate	84-66-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Diethyl phthalate	84-66-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Diethyl phthalate	84-66-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Diethyl phthalate	84-66-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dimethyl phthalate	131-11-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dimethyl phthalate	131-11-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dimethyl phthalate	131-11-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dimethyl phthalate	131-11-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dimethylphenol, 2,4-	105-67-9	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Dimethylphenol, 2,4-	105-67-9	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dimethylphenol, 2,4-	105-67-9	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dimethylphenol, 2,4-	105-67-9	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Di-n-butyl phthalate	84-74-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Di-n-butyl phthalate	84-74-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Di-n-butyl phthalate	84-74-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Di-n-butyl phthalate	84-74-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dinitro-2-methylphenol, 4,6-	534-52-1	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Dinitro-2-methylphenol, 4,6-	534-52-1	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrobenzene, 1,3-	99-65-0	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Dinitrophenol, 2,4-	51-28-5	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Dinitrophenol, 2,4-	51-28-5	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Dinitrophenol, 2,4-	51-28-5	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Dinitrophenol, 2,4-	51-28-5	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Dinitrotoluene, 2,4-	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrotoluene, 2,4-	121-14-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dinitrotoluene, 2,4-	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrotoluene, 2,4-	121-14-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dinitrotoluene, 2,4-	121-14-2	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrotoluene, 2,4-	121-14-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dinitrotoluene, 2,4-	121-14-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dinitrotoluene, 2,4- exp	121-14-2	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Dinitrotoluene, 2,6-	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrotoluene, 2,6-	606-20-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Dinitrotoluene, 2,6-	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrotoluene, 2,6-	606-20-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Dinitrotoluene, 2,6-	606-20-2	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Dinitrotoluene, 2,6-	606-20-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Dinitrotoluene, 2,6-	606-20-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Dinitrotoluene, 2,6- exp	606-20-2	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Di-n-octyl phthalate	117-84-0	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Di-n-octyl phthalate	117-84-0	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Di-n-octyl phthalate	117-84-0	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Di-n-octyl phthalate	117-84-0	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Fluoranthene	206-44-0	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Fluoranthene	206-44-0	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Fluoranthene	206-44-0	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Fluoranthene	206-44-0	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Fluorene	86-73-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Fluorene	86-73-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Fluorene	86-73-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Fluorene	86-73-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Hexachlorobenzene	118-74-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Hexachlorobenzene	118-74-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Hexachlorobenzene	118-74-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Hexachlorobenzene	118-74-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Hexachlorobutadiene	87-68-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Hexachlorobutadiene	87-68-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Hexachlorobutadiene	87-68-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Hexachlorobutadiene	87-68-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Hexachlorocyclopentadiene	77-47-4	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Hexachlorocyclopentadiene	77-47-4	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Hexachlorocyclopentadiene	77-47-4	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Hexachlorocyclopentadiene	77-47-4	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Hexachloroethane	67-72-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Hexachloroethane	67-72-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Hexachloroethane	67-72-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Hexachloroethane	67-72-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.5 U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.5 U
HMX	2691-41-0	0.25	mg/kg	0.5	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.5 U
HMX	2691-41-0	0.25	mg/kg	0.5	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.5 UU
Indeno(1,2,3-cd)pyrene	193-39-5	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Isophorone	78-59-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Isophorone	78-59-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Isophorone	78-59-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Isophorone	78-59-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Lead	7439-92-1	2.8	mg/kg	0.37		PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	0.37
Lead	7439-92-1	8.9	mg/kg	0.39		PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	0.39
Lead	7439-92-1	8.5	mg/kg	0.36		PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	0.36
Lead	7439-92-1	5.05	mg/kg	0.355		PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	0.355
Mercury	7439-97-6	0.06	mg/kg	0.12	U	PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	0.12 U
Mercury	7439-97-6	0.065	mg/kg	0.13	U	PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	0.13 U
Mercury	7439-97-6	0.06	mg/kg	0.12	U	PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	0.12 U
Mercury	7439-97-6	0.06	mg/kg	0.12	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	0.12 UU
Methylnaphthalene, 2-	91-57-6	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Methylnaphthalene, 2-	91-57-6	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Methylnaphthalene, 2-	91-57-6	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Methylnaphthalene, 2-	91-57-6	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Methylphenol, 2-	95-48-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Methylphenol, 2-	95-48-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Methylphenol, 2-	95-48-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Methylphenol, 2-	95-48-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Methylphenol, 4-	106-44-5	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Methylphenol, 4-	106-44-5	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Methylphenol, 4-	106-44-5	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Methylphenol, 4-	106-44-5	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Naphthalene	91-20-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Naphthalene	91-20-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Naphthalene	91-20-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Naphthalene	91-20-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Nitroaniline, 2-	88-74-4	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Nitroaniline, 2-	88-74-4	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Nitroaniline, 2-	88-74-4	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Nitroaniline, 2-	88-74-4	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Nitroaniline, 3-	99-09-2	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Nitroaniline, 3-	99-09-2	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Nitroaniline, 3-	99-09-2	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Nitroaniline, 3-	99-09-2	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Nitroaniline, 4-	100-01-6	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Nitroaniline, 4-	100-01-6	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Nitroaniline, 4-	100-01-6	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Nitroaniline, 4-	100-01-6	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Nitrobenzene	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrobenzene	98-95-3	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Nitrobenzene	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrobenzene	98-95-3	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Nitrobenzene	98-95-3	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Nitrobenzene	98-95-3	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Nitrobenzene	98-95-3	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Nitrobenzene - exp	98-95-3	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Nitrophenol, 2-	88-75-5	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Nitrophenol, 2-	88-75-5	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Nitrophenol, 2-	88-75-5	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Nitrophenol, 2-	88-75-5	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Nitrophenol, 4-	100-02-7	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Nitrophenol, 4-	100-02-7	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Nitrophenol, 4-	100-02-7	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Nitrophenol, 4-	100-02-7	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 2-	88-72-2	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 3-	99-08-1	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Nitrotoluene, 4-	99-99-0	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
n-Nitroso-di-n-propylamine	621-64-7	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
n-Nitroso-di-n-propylamine	621-64-7	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
n-Nitroso-di-n-propylamine	621-64-7	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
n-Nitroso-di-n-propylamine	621-64-7	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
n-Nitrosodiphenylamine	86-30-6	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
n-Nitrosodiphenylamine	86-30-6	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
n-Nitrosodiphenylamine	86-30-6	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
n-Nitrosodiphenylamine	86-30-6	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Pentachlorophenol	87-86-5	0.495	mg/kg	0.99	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.99 U
Pentachlorophenol	87-86-5	0.5	mg/kg	1	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	1 U
Pentachlorophenol	87-86-5	0.485	mg/kg	0.97	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.97 U
Pentachlorophenol	87-86-5	0.475	mg/kg	0.95	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.95 UU
Phenanthrene	85-01-8	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Phenanthrene	85-01-8	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Phenanthrene	85-01-8	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Phenanthrene	85-01-8	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Phenol	108-95-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Phenol	108-95-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Phenol	108-95-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Phenol	108-95-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Pyrene	129-00-0	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Pyrene	129-00-0	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Pyrene	129-00-0	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Pyrene	129-00-0	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.5 U
RDX	121-82-4	0.25	mg/kg	0.5	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.5 UU
Selenium	7782-49-2	0.31	mg/kg	0.62	U	PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	0.62 U
Selenium	7782-49-2	0.85	mg/kg	0.64		PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	0.64
Selenium	7782-49-2	0.73	mg/kg	0.6		PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	0.6
Selenium	7782-49-2	0.2975	mg/kg	0.595	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	0.595 UU
Silver	7440-22-4	0.31	mg/kg	0.62	U	PBOW99-SDW101	PBOW99SDW101	METALS	REG	9-Jun-99	0	0	0.62 U
Silver	7440-22-4	0.32	mg/kg	0.64	U	PBOW99-SDW102	PBOW99SDW102	METALS	REG	9-Jun-99	0	0	0.64 U
Silver	7440-22-4	0.3	mg/kg	0.6	U	PBOW99-SDW103	PBOW99SDW103	METALS	REG	9-Jun-99	0	0	0.6 U

Table E-5
Sediment Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Silver	7440-22-4	0.2975	mg/kg	0.595	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	METALS	FDREG	9-Jun-99	0	0	0.595 UU
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.65 U
Tetryl	479-45-8	0.325	mg/kg	0.65	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.65 UU
Trichlorobenzene, 1,2,4-	120-82-1	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Trichlorobenzene, 1,2,4-	120-82-1	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Trichlorobenzene, 1,2,4-	120-82-1	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Trichlorobenzene, 1,2,4-	120-82-1	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Trichlorophenol, 2,4,5-	95-95-4	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Trichlorophenol, 2,4,5-	95-95-4	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Trichlorophenol, 2,4,5-	95-95-4	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Trichlorophenol, 2,4,5-	95-95-4	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Trichlorophenol, 2,4,6-	88-06-2	0.205	mg/kg	0.41	U	PBOW99-SDW101	PBOW99SDW101	SEMIVOLATILES	REG	9-Jun-99	0	0	0.41 U
Trichlorophenol, 2,4,6-	88-06-2	0.215	mg/kg	0.43	U	PBOW99-SDW102	PBOW99SDW102	SEMIVOLATILES	REG	9-Jun-99	0	0	0.43 U
Trichlorophenol, 2,4,6-	88-06-2	0.2	mg/kg	0.4	U	PBOW99-SDW103	PBOW99SDW103	SEMIVOLATILES	REG	9-Jun-99	0	0	0.4 U
Trichlorophenol, 2,4,6-	88-06-2	0.195	mg/kg	0.39	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	SEMIVOLATILES	FDREG	9-Jun-99	0	0	0.39 UU
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Trinitrobenzene, 1,3,5-	99-35-4	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SDW101	PBOW99SDW101	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SDW102	PBOW99SDW102	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	U	PBOW99-SDW103	PBOW99SDW103	EXPLOSIVES	REG	9-Jun-99	0	0	0.25 U
Trinitrotoluene, 2,4,6-	118-96-7	0.125	mg/kg	0.25	UU	PBOW99-SDW104	PBOW99SDW105PBOW99SDW104	EXPLOSIVES	FDREG	9-Jun-99	0	0	0.25 UU

Table E-6
Surface Water Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

PARAMETER	CASNUM	RES	UNIT	DETLIMIT	VQUAL	LOCATION_CODE	SAMPLE_NO	USER_TEST_PANEL	PURPOSE	SAMPLE_DATE	METH_DET_LIM	LAB_QUAL	FILTERED
Calcium	7440-70-2	102000	ug/L	1000		WWTP1-SW01	WW2000	METALS	REG	21-May-09	100		N
Iron	7439-89-6	5330	ug/L	300		WWTP1-SW01	WW2000	METALS	REG	21-May-09	23		N
Magnesium	7439-95-4	18100	ug/L	5000		WWTP1-SW01	WW2000	METALS	REG	21-May-09	100		N
Manganese	7439-96-5	534	ug/L	15		WWTP1-SW01	WW2000	METALS	REG	21-May-09	0.5		N
Sodium	7440-23-5	38900	ug/L	10000		WWTP1-SW01	WW2000	METALS	REG	21-May-09	500		N
Aluminum	7429-90-5	66.5	ug/L	200	J	WWTP1-SW01	WW2000	METALS	REG	21-May-09	11	B	N
Barium	7440-39-3	37.9	ug/L	200	J	WWTP1-SW01	WW2000	METALS	REG	21-May-09	5	B	N
Potassium	7440-09-7	3490	ug/L	20000	J	WWTP1-SW01	WW2000	METALS	REG	21-May-09	100	B	N
Selenium	7782-49-2	3.8	ug/L	10	J	WWTP1-SW01	WW2000	METALS	REG	21-May-09	3.1	B	N
3-Methylphenol and 4-Methylphenol	65794-96-9	4.7	ug/L	4.8	J	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	J	N
Phenol	108-95-2	2.8	ug/L	4.8	J	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	J	N
Amino-2,6-dinitrotoluene, 4-	19406-51-0	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.048	U	N
Amino-4,6-dinitrotoluene, 2-	35572-78-2	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.073	U	N
Dinitrobenzene, 1,3-	99-65-0	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.049	U	N
Dinitrotoluene, 2,4-	121-14-2	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.062	U	N
Dinitrotoluene, 2,6-	606-20-2	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.089	U	N
HMX	2691-41-0	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.1	U	N
Nitrobenzene	98-95-3	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.048	U	N
Nitrotoluene, 2-	88-72-2	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.061	U	N
Nitrotoluene, 3-	99-08-1	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.092	U	N
Nitrotoluene, 4-	99-99-0	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.072	U	N
RDX	121-82-4	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.071	U	N
Tetryl	479-45-8	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.074	U	N
Trinitrobenzene, 1,3,5-	99-35-4	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.048	U	N
Trinitrotoluene, 2,4,6-	118-96-7	0.095	ug/L	0.19	U	WWTP1-SW01	WW2000	EXPLOSIVES	REG	21-May-09	0.066	U	N
Antimony	7440-36-0	3	ug/L	6	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	4.5	U	N
Arsenic	7440-38-2	5	ug/L	10	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	3.6	U	N
Beryllium	7440-41-7	2	ug/L	4	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	1	U	N
Cadmium	7440-43-9	2.5	ug/L	5	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	1	U	N
Chromium	7440-47-3	5	ug/L	10	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	1.6	U	N
Cobalt	7440-48-4	25	ug/L	50	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	0.83	U	N
Copper	7440-50-8	12.5	ug/L	25	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	2.1	U	N
Lead	7439-92-1	5	ug/L	10	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	2	U	N
Mercury	7439-97-6	0.5	ug/L	1	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	0.14	U	N
Nickel	7440-02-0	20	ug/L	40	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	2.3	U	N
Silver	7440-22-4	5	ug/L	10	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	1.2	U	N
Thallium	7440-28-0	5	ug/L	10	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	3.4	U	N
Vanadium	7440-62-2	25	ug/L	50	U	WWTP1-SW01	WW2000	METALS	REG	21-May-09	0.66	U	N
Acenaphthene	83-32-9	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Acenaphthylene	208-96-8	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Anthracene	120-12-7	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Benzo(a)anthracene	56-55-3	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Benzo(a)pyrene	50-32-8	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Benzo(b)fluoranthene	205-99-2	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Benzo(ghi)perylene	191-24-2	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Benzo(k)fluoranthene	207-08-9	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N
Benzoic acid	65-85-0	12	ug/L	24	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	9.6	U	N
Benzyl alcohol	100-51-6	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96	U	N

Table E-6
Surface Water Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Bis(2-chloroethoxy)methane	111-91-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Bis(2-chloroethyl)ether	111-44-4	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Bis(2-chloroisopropyl)ether	108-60-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Bis(2-ethylhexyl)phthalate	117-81-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N
Bromophenyl phenyl ether, 4-	101-55-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Butyl benzyl phthalate	85-68-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Carbazole	86-74-8	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Chloro-3-methylphenol, 4-	59-50-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Chloroaniline, 4-	106-47-8	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Chloronaphthalene, 2-	91-58-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Chlorophenol, 2-	95-57-8	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.2 U	N
Chlorophenyl phenyl ether, 4-	7005-72-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Chrysene	218-01-9	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Di-n-butyl phthalate	84-74-2	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Di-n-octyl phthalate	117-84-0	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.4 U	N
Dibenz(a,h)anthracene	53-70-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dibenzofuran	132-64-9	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dichlorobenzene, 1,2-	95-50-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dichlorobenzene, 1,3-	541-73-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dichlorobenzene, 1,4-	106-46-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dichlorobenzidine, 3,3'-	91-94-1	4.8 ug/L	9.6 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N
Dichlorophenol, 2,4-	120-83-2	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.2 U	N
Diethyl phthalate	84-66-2	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N
Dimethyl phthalate	131-11-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dimethylphenol, 2,4-	105-67-9	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.2 U	N
Dinitro-2-methylphenol, 4,6-	534-52-1	4.8 ug/L	9.6 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	3.8 U	N
Dinitrophenol, 2,4-	51-28-5	12 ug/L	24 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	9.6 U	N
Dinitrotoluene, 2,4-	121-14-2	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Dinitrotoluene, 2,6-	606-20-2	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Fluoranthene	206-44-0	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Fluorene	86-73-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Hexachlorobenzene	118-74-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Hexachlorobutadiene	87-68-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	2.4 U	N
Hexachlorocyclopentadiene	77-47-4	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.2 U	N
Hexachloroethane	67-72-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	2.4 U	N
Indeno(1,2,3-cd)pyrene	193-39-5	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.1 U	N
Isophorone	78-59-1	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Methylnaphthalene, 2-	91-57-6	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Methylphenol, 2-	95-48-7	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Naphthalene	91-20-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Nitroaniline, 2-	88-74-4	4.8 ug/L	9.6 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N
Nitroaniline, 3-	99-09-2	4.8 ug/L	9.6 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N
Nitroaniline, 4-	100-01-6	4.8 ug/L	9.6 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N
Nitrobenzene	98-95-3	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Nitrophenol, 2-	88-75-5	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.2 U	N
Nitrophenol, 4-	100-02-7	12 ug/L	24 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	9.6 U	N
Pentachlorophenol	87-86-5	12 ug/L	24 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	9.6 U	N
Phenanthrene	85-01-8	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Pyrene	129-00-0	2.4 ug/L	4.8 U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N

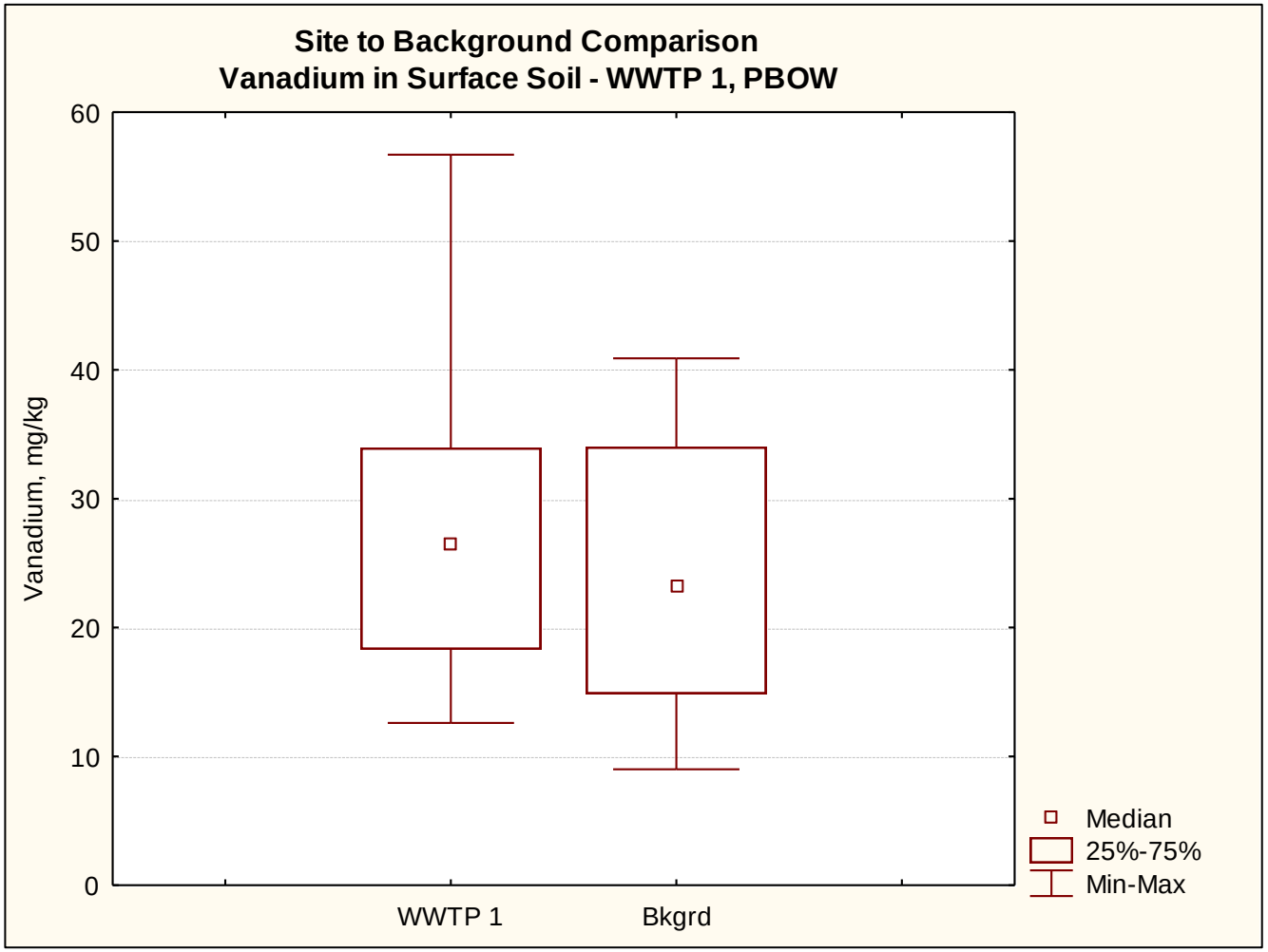
Table E-6
Surface Water Analytical Data Used in Waste Water Treatment Plant 1 Baseline Human Health Risk Assessment

Trichlorobenzene, 1,2,4-	120-82-1	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
Trichlorophenol, 2,4,5-	95-95-4	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.3 U	N
Trichlorophenol, 2,4,6-	88-06-2	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.3 U	N
n-Nitroso-di-n-propylamine	621-64-7	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	0.96 U	N
n-Nitrosodiphenylamine	86-30-6	2.4	ug/L	4.8	U	WWTP1-SW01	WW2000	SEMIVOLATILES	REG	21-May-09	1.9 U	N

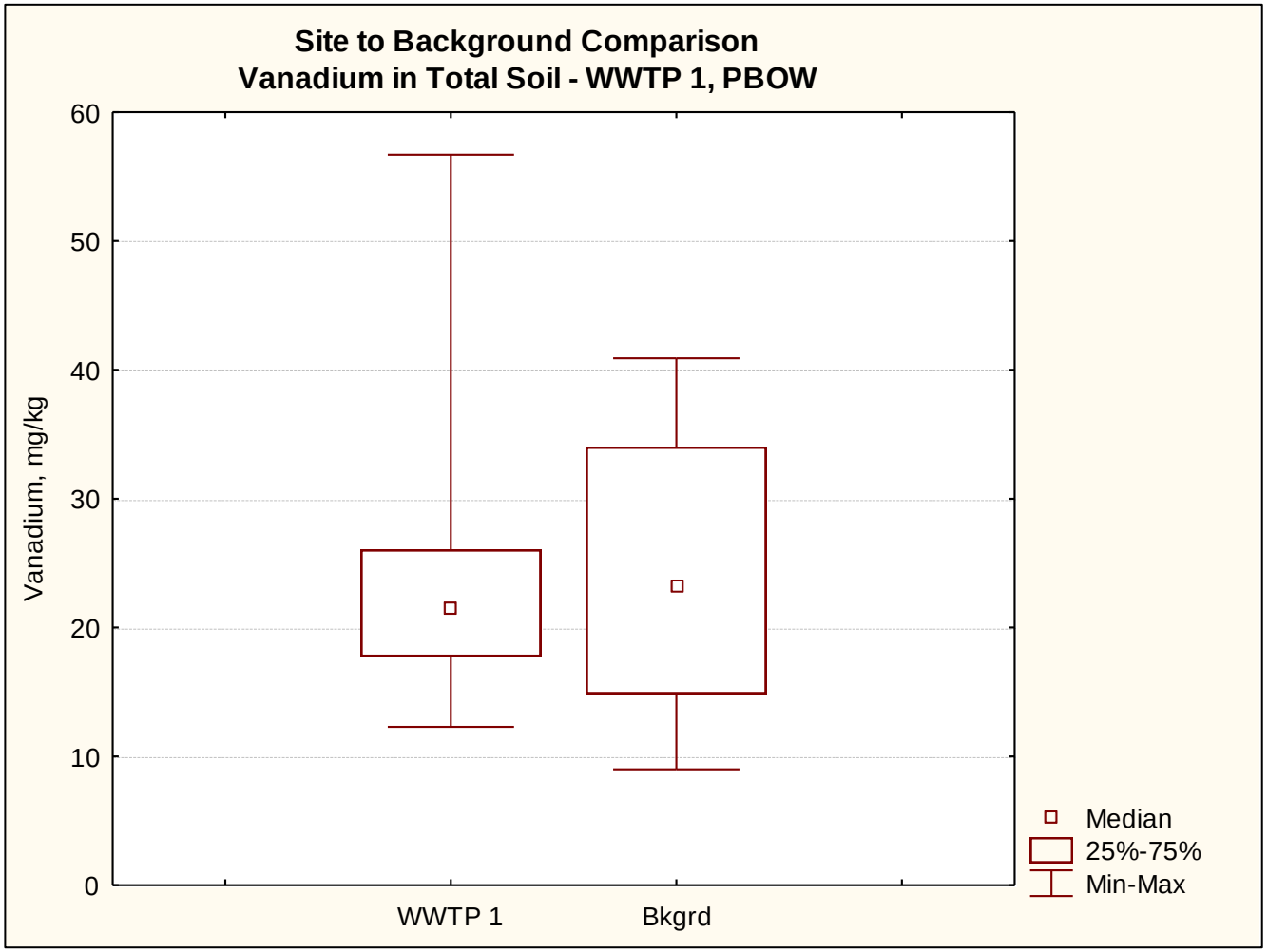
APPENDIX F

WILCOXON RANK SUM STATISTICAL TEST OUTPUT

	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided	
Vanadium	157.0000	143.0000	65.00000	0.404145	0.686106	0.404321	0.685977	12	12	0.712535	Passed



	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided	
Vanadium	558.5000	261.5000	152.5000	-0.457468	0.647335	-0.457532	0.647289	28	12	0.651718	Passed



RESPONSE TO COMMENTS

Response to External Comments
Draft Baseline Human Health Risk Assessment and
Screening-Level Ecological Risk Assessment,
Waste Water Treatment Plant 1
Plum Brook Ordnance Works, Sandusky, Ohio,
Dated June 30, 2011
FUDS Project No. G05OH001817

Comments by Janusz Byczkowski, Ph.D., Ohio Environmental Protection Agency (OEPA) Toxicologist, received August 30, 2011.

Comment 1: **BHHRA Executive Summary Page ES-4, Line 27; and Page ES-5 Line 5; Section 7.3, Page 7-3, Lines 16 and 26. This document states: "*…Recommendations: No remedial actions or further investigation of WWTP1 media are recommended. If the contributions of exposure to groundwater, none of the WWTP1 receptors had ILCRs or HIs that exceed the PBOW target values…*"**

At the baseline (or screening) risk assessment phase of the RI, the quoted above first sentence of the "*Recommendations*", is premature and thus inappropriate. Any recommendation regarding the remedial actions and management of risk at the Site should be made at the feasibility study phase (FS) of the project, but not at BHHRA/SLERA. According to the NRC (1983) "*Red Book*", which formed a basis of risk assessment paradigm:

"*...Risk assessment and risk management involve different goals* [...] *The goal of risk assessment is to describe, as accurately as possible, the possible health consequences of changes in human exposure to a hazardous substance; the need for accuracy implies that the best available scientific knowledge, supplemented as necessary by assumptions that are consisted with science will be applied...*" The second sentence of the "*Recommendations*" quoted above, as written, does not make sense.

Please revise this statement and remove recommendations regarding risk management from both the Baseline Human Health Risk Assessment and Screening level Ecological Risk Assessment documents.

Reference:
NRC (1983) Commission on Life Sciences. Risk Assessment in the Federal Government: Managing the Process (1983). On line: http://books.nap.edu/books/0309033497/html/index.html

Response 1: Since issuing this comment and a draft response, Rick Meadows (USACE) and Paul Jayko and Archie Lunsey (OEPA) agreed during a November 22, 2011 teleconference that the Recommendations section will be removed from the BHHRA and SLERA and inserted into the Remedial Investigation (RI)

report which will summarize the site characterization report, BHHRA, and SLERA. Also, the referenced sentence will be revised to state that, "If the contributions of exposure to groundwater *are excluded*, none of the …"

Please note that EPA (1988) guidance states, "The results of the baseline risk assessment may indicate that the site poses little or no threat to human health or the environment. In such situations, the FS should either be scaled as appropriate to that site and its potential hazard, or eliminated altogether. *The results of the RI and the baseline risk assessment will therefore serve as the primary means of documenting a no-action decision* (italics added for emphasis)." The purpose of including "Recommendations" in the RI Report is to clearly convey and document information to the Project Delivery Team that the USACE regards as imperative to the total CERCLA and DERP-FUDS project closure processes. Types of recommendations arising from the RI/risk assessment process may include one or more of the following:

- Proceed to FS
- No (further) action: no FS required; proceed to no (further) action proposed plan
- Perform additional sampling to close a data gap
- Perform additional evaluation (e.g., treatability study, probabilistic risk assessment)
- Perform a time-critical or non-time critical removal action.

According to DERP-FUDS guidance, there is no basis to conduct an FS where no unacceptable risk is identified nor any regulatory levels exceeded (USACE, 2004).

A recommendation of the NRC Red Book provided by the reviewer is: "…that the regulatory agencies take steps to establish and maintain a clear conceptual difference between assessment of risks and consideration of risk management alternative; that is, the scientific findings and policy judgments embodied in risk assessments should be explicitly distinguished from the political, economic, and technical considerations that influence the design and choice of regulatory strategies." This recommendation emphasizes risk management on a regulatory policy programmatic level, rather than at a project or site level. This is consistent with the following definition of risk management found on page 3 of the Red Book: "Risk management is the process of weighing policy alternatives and selecting the most appropriate regulatory action, interpreting the results of risk assessment with engineering data, and with social , economic, and political concerns to reach a decision."

The paragraphs that follow this definition advocate the adoption of procedural measures to facilitate the recommendation of maintaining a distinction between risk assessment and risk management. Programmatically, the process of risk management described by the NRC Red Book definition is largely

elucidated by the National Oil and Hazardous Substances Pollution Contingency Plan Under the Comprehensive Environmental Response Compensation, and Liability Act of 1980 (NCP) (EPA, 1990) at 40 CFR 300.430. The WWTP1 RI, including the BHHRA, was performed consistent with the NCP and is thus consistent with the NRC Red Book.

Comment 2: **BHHRA Section 1.6, Page 1-7, Line 11 and Section 7.3, Page 7-3, Lines 16 and 26.**
This document states: *"…issues that are most likely to directly affect site management decisions…"*

Both, baseline human health risk assessment (BHHRA) and screening level ecological risk assessment (SLERA) should be performed under the assumption that no change or remediation has been done at the Site. According to U.S. EPA (1989) RAGS part A: "*…the baseline risk assessment […] is an analysis of the potential adverse health effects (current or future) caused by hazardous substances released from a site in the absence of any actions to control or mitigate these releases (i.e. under an assumption of no action)*…"

Any issue regarding the management decisions and Site remediation should be presented and discussed at the FS phase of the project (see comment # 1, above). Please remove recommendations regarding the risk management from the Baseline Human Health Risk Assessment and Screening Level Ecological Risk Assessment documents.

References:
U.S. EPA (1989) Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December 1989. On line:
http://www.epa.gov/oswer/riskassessment/ragsa/index.htm

Response: The specific statement referenced by the reviewer will be revised consistent with the following: "…, focusing on those issues that are most pertinent to the WWTP1 site and those most likely to have the greatest effect on risk estimates." As described in the response to reviewer Comment No. 1, "Recommendations" will be removed from Chapter 7.0, and they will also be removed from the third bullet on Page 1-7.

Both the BHHRA and SLERA were performed under current site conditions, assuming no future remedial actions. Please note that current conditions include prior removal and demolition actions that occurred at PBOW chiefly during the latter portion of the 1940's through the 1960's.

Comment 3: **BHHRA Section 2.4.1, P. 2-5, Line 27. This document states: "*…Note that this previously made PBOW Team agreement for screening surface water and sediment (OEPA, 1999), which considered site-specific conditions, takes precedence over current OEPA (2009b) guidance*…" This issue was**

already discussed before. The OEPA-DERR does not agree that the 1999 "*email correspondence between Lawrence Sirinek (OEPA Risk Assessor) and Paul Goetchius (Shaw Risk Assessor), March 5*" takes precedence over the current OEPA (2009b) guidance regarding the screening levels with 1/10 adjustment for aggregate and cumulative toxicity of potentially hazardous non-carcinogenic chemicals.

If the Lead Agency decided to do not take advantage of the OEPA-DERR (2009) guidance, then the "concentration-toxicity screen" should be performed as described in the U.S. EPA (1989) RAGS Part A (section 5.9.5; p. 23-24).

Reference:
OEPA-DERR (2009) Use of U.S. EPA's Regional Screening Levels as Screening Values in Human Health Risk Assessments. 21 August 2009. On line: http://epa.ohio.gov/portals/30/rules/screening.pdf

Response 3: The PBOW Project Delivery Team, including members from the USACE Nashville and Huntington Districts and their contractors, the National Aeronautics and Space Administration (NASA), and the Ohio Environmental Protection Agency (OEPA) have worked cohesively as the PBOW Project Delivery Team for more than a decade. Numerous site-specific team agreements have been made over the years as documented by meeting minutes and email correspondence. The team has operated on the understanding that such agreements would be honored unless replaced by a different team agreement. None of the Project Delivery Team parties should unilaterally change a team agreement; revisions to a team agreement would be made only by team consensus. The OEPA team members have expressed support with this approach.

The USACE does not disagree in principle with the OEPA-DERR guidance. However, this guidance is written for any generic site in Ohio, including those where surface water may be used as drinking water and the degree of human exposure to sediment may equal or approach that of residential soil. Surface water is not currently used and clearly will not be used in the future as a potable water source, and the exposure to sediment at WWTP1 would be very limited in comparison to soil, given the limited areal extent of sediment at R2BG. OEPA (1999) acknowledged this in their email correspondence as the basis for using the unadjusted Region 9 Preliminary Remediation Goals (PRGs), the predecessor of the RSLs. Nothing has changed with respect to plausible future uses of PBOW that would result in the need to alter these assumptions concerning surface water and sediment exposure inherent in the PBOW screening approach. There is no technical basis to revise this previously agreed-upon approach.

Use of the current generic OEPA method for screening WWTP1 surface water and sediment would have identified iron and manganese as COPCs in surface water and would have resulted in no additional COPCs for sediment. Neither

of these inorganics are related to former WWTP1 activities, and the addition of these non-site-related analytes to the quantitative risk characterization would have had a negligible effect with respect to risk assessment results or the relevant receptors (i.e., construction worker and resident). A brief statement to this effect will be added in the uncertainty analysis.

The reviewer also recommends the concentration/toxicity screening approach suggested in RAGS A (EPA, 1989). USACE (1999) does not recognize this approach, and this approach is not recognized in more recent EPA guidance (EPA, 2001). This RAGS A approach was suggested prior to the development and of risk-based concentrations tables (EPA Region 3) and preliminary remediation goal tables (EPA Region 9) in the early 1990's, and their subsequent use for screening in baseline risk assessments. The RAGS A concentration/toxicity approach has numerous technical problems, including a lack of consideration for dermal uptake efficiencies, and the reliance on "relative toxicity" among chemicals rather than on predicted, conservative risk-based values at a given concentration (i.e., ILCR of 1E-6 or HQ of 0.1). USACE (1999) risk assessment guidance correctly states that "…it is imperative that these (health-based screening such as Region 9 PRGs and Region 3 RBCs) values be applied within the context that they were developed." The RAGS A method suggests comparing media concentration values (e.g., mg/L) to dose rates (mg/kg-day) or dose-based risk rates (mg/kg-day)$^{-1}$, where the units and context are dissimilar. The use of dissimilar units is a generally discouraged practice, especially when the measurements goals (concentrations versus dose rates or dose-based risk rates) of these units are quite different. Using consistent units for maximum detected concentrations and human health risk-based screening concentrations is a current, widely accepted practice (e.g., EPA, 2008; 2001; 1995) that has been used for two decades. In summary, the suggested RAGS A method is not current and is unreliable for screening, as it may identify "COPCs" that truly represent de minimis risk, and it may exclude COPCs that represent a potential human health risk or hazard using current human health risk assessment guidance.

Comment 4: Section 4.1, Page 2-5, Line 27. This document states:

Equation 4-1:

"*…SF = (P(d) – P(0))/(1 – P(0))*
where:
SF = chemical-specific factor per unit dose (mg/kg-day)$^{-1}$…"

This issue was already discussed before. Since both expressions – in numerator and denominator - are just unitless probabilities, the resulting ratio cannot be expressed in units of a reciprocal dose (mg/kg-day)$^{-1}$. Perhaps, this equation might reflect the "extra risk" (ER) rather than the SF. Please either eliminate this equation or provide correct mathematical representation of the applicable risk parameter:

SF = CR/CDI
where:
CR is carcinogenic risk (unitless probability);
CDI is chronic daily intake (in mg/kg per day)

Response: We agree that the equation, intended to demonstrate "extra risk", has erroneous units. The equation is extraneous and will be deleted.

Comment 5: **Tables 2-2, 2-4, and 4-1. <u>This document states:</u> "…*Statistical Distribution* […] *L* […] *NP*…" "…*Chemical* […] *RDX*…" "…*Target Organs* […] *E*…" Please explain meaning of symbols not listed in the "*List of Acronyms*" (e.g., *L, NP, RDX, E, etc.*). Please explain meaning of all non-standard symbols and abbreviations used.**

Response 5: The abbreviations provided at the bottom of the respective tables will be reviewed and revised as necessary.

Comment 6: **SLERA Section 2.2.3.3, Page 2-13, Line 9. <u>This document states:</u> "…*The background data set and derivation of soil BSCs for all POW soil investigations are described in IT (1998)*…"**

This issue was already discussed before. Please note that the BSC values were generated using an obsolete background screening methodology, currently not recommended by Ohio EPA. Please emphasize that the background screening methodology used differs from that currently recommended by OEPA-DERR, and provide justification.

Response 6: Text will be added to the third full paragraph of Page ES-1 stating that background screening for inorganics differs from OEPA-DERR (2004). In section 2.2.3.3, Background Evaluation, the second full paragraph will be expanded with rationale for background inorganic screening, and will state that the background screening differs from the OEPA-DERR 2004 methodology. In Section 2.2.3.3 a more detailed description of inorganic background screening will be included. The PBOW Project Delivery Team, including members from the U.S. Army Corps of Engineers (USACE), Nashville and Huntington Districts and their contractors, the National Aeronautics and Space Administration (NASA), and the OEPA have worked cohesively as the PBOW Project Delivery Team for more than a decade. Site-specific team agreements have been made over the years, including how background screening for inorganics is performed. The methodology used for background screening and evaluation in the risk assessment for inorganics was previously requested by OEPA risk assessors for soil in 1999 and was again agreed to by the Project Delivery Team in 2002 for groundwater (Shaw, 2005). It has been used for all PBOW risk assessments conducted since 1999 for consistency from AOC to AOC. Please also refer to the response to the reviewer's Comment No. 3 on the BHHRA.

Comment 7: **SLERA Section 5.1, Page 5-1, Lines 23-32. <u>This document states:</u>**

"*…HQs less than or equal to 1 represent no probable risk, HQs from 1 up to but less than 10 represent a low potential for environmental effects, HQs from 10 up to but less than 100 represent significant potential that effects could result from greater exposure, and HQs greater than 100 represent the highest potential for expected effects…*"

Such a stratification of hazard quotients (HQs) seems to be quite arbitrary and definitely this whole discussion does not belong in "*Hazard Estimation*" (see also comments # 1 and 2, above). Although, this paragraph may be reused in the next Section 5.2, "*Uncertainty Analysis*". Please either delete this paragraph, or move it to the *Uncertainty Analysis* section.

Response 7: The subject text will be moved to the Uncertainty Analysis (Section 5.2).

References Used in Responses:

National Research Council (NRC), 1983, ***Risk Assessment in the Federal Government: Managing the Process, Committee on the Institutional Means for Assessment of Risks to Public Health***, Commission on Life Sciences, National Academies Press, Washington, D.C., 191 Pages.

Ohio Environmental Protection Agency (OEPA), 2004, ***Subject: Background Calculation Methodology***, Division of Emergency and Remedial Response, June 30.

Ohio Environmental Protection Agency (OEPA), 1999, email correspondence between Lawrence Sirinek (OEPA Risk Assessor) and Paul Goetchius (Shaw Risk Assessor), March 5.

Shaw Environmental, Inc. (Shaw), 2005, ***2004 Groundwater Data Summary and Evaluation Report, Final, Former Plum Brook Ordnance Works, Sandusky, Ohio***, April.

U.S. Army Corps of Engineers (USACE), 2004, ***Formerly Used Defense Sites Program Policy***, Regulation No. 200-3-1, ER 200-3-1, May 14.

U.S. Army Corps of Engineers (USACE), 1999, ***Risk Assessment Handbook, Volume I: Human Health Evaluation***, Engineer Manual EM 200-1-4, January 31.

U.S. Environmental Protection Agency (EPA), 2008, "Risk-Based Concentration Table." Memorandum from J. Hubbard (Region 3 Toxicologist) to All RBC Table Users, Region 3, Philadelphia, Pennsylvania, September 11.

U.S. Environmental Protection Agency (EPA), 2001, ***Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk***

Assessments), Final, Office of Emergency and Remedial Response, Washington, D.C., December, EPA540/R-97/033.

U.S. Environmental Protection Agency (EPA), 1995, ***Supplemental Guidance to RAGS: Region 4 Bulletins Ecological Risk Assessment***, Waste Management Division, Atlanta, Georgia, November.

U.S. Environmental Protection Agency (EPA), 1990, "National Oil and Hazardous Substances Pollution Contingency Plan," ***Federal Register*** 55(46): 8666-8865.

U.S. Environmental Protection Agency (EPA), 1989, ***Risk Assessment Guidance for Superfund***, ***Volume I, Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/1-89/002.