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Kingston Ash Recovery Project
Non-Time Critical Removal Action
River System
Baseline Human Health Risk Assessment

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List of Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
BHHRA	Baseline Human Health Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSF	cancer slope factor
cm	centimeter
cm^2	square centimeter
COC	constituent of concern
CoC	chain-of-custody
COPC	constituent of potential concern
CRM	Clinch River Mile
CSF	cancer slope factor
DMA	direct mercury analysis
DQO	data quality objective
EDD	electronic data deliverable
EE/CA	Engineering Evaluation/Cost Analysis
ERM	Emory River Mile
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
Frontier	Frontier Global Services (formerly Frontier GeoSciences)
GAF	gastrointestinal absorption factor
GEL	GEL Laboratories, LLC
HI	hazard index
HQ	hazard quotient
ICP/MS	inductively coupled plasma/mass spectrophotometer
kg	kilogram
KIF	Kingston Fossil Plant
ILCR	incremental lifetime cancer risk
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOAEL	lowest-observed-adverse-effect level
KM	Kaplan-Meier
MAG	method and analyte group
MDL	method detection limit
mg	milligram
mg/kg	milligram per kilogram
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NOAEL	no-observed-adverse-effect level
Pace	Pace Analytical Services, Inc.
PAH	polynuclear aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
pCi	picocurie
PPRTV	provisional peer reviewed toxicity value
QAPP	Quality Assurance Project Plan
RPD	relative percent difference
RfD	reference dose

RL	reporting limit
RME	reasonable maximum exposure
SAP	Sampling and Analysis Plan
SM	standard method
SOP	Standard Operating Procedure
TDEC	Tennessee Department of Environment and Conservation
TRM	Tennessee River Mile
UCL	upper confidence level

EXECUTIVE SUMMARY

On December 22, 2008, approximately 5.4 million cubic yards of ash material were released into the Swan Pond Embayment and adjacent Emory River. In response to this release, TVA undertook immediate response actions and worked in close coordination with the U.S. Environmental Protection Agency (EPA), Tennessee Department of Environment and Conservation (TDEC), and other agencies to provide for the safety of area residents, to contain released ash and minimize its downriver migration, and to monitor and assess air and water quality. On January 12, 2009, TDEC issued a Commissioner's Order to TVA requiring the comprehensive assessment, cleanup and restoration of areas impacted by the release. On May 11, 2009, an Administrative Order and Agreement on Consent (EPA Order) was signed between EPA and TVA providing the regulatory framework for the removal actions under the Comprehensive Environmental Response, Compensation, and Liability Act. TVA undertook time-critical actions to achieve short-term strategic Site objectives defined in the EPA Order. These actions included dredging of ash from the Emory River, dewatering of the recovered ash, loading of the dewatered ash into railcars, and ultimate disposal of the ash at the Arrowhead Landfill in Alabama.

The objective of this Baseline Human Health Risk Assessment (BHHRA) is to develop quantitative and qualitative estimates of potential cancer risks and noncancer hazards for human receptors exposed to environmental media impacted by any residual ash in the river system. The risk analysis was based on analytical data collected in 2010 and 2011 from surface water, seasonally-exposed sediment, and fish tissue (filet) sampling.

Sampling was planned within different sections or reaches of the river system, as shown on Figure 1. These ten reaches are described below.

- Reference locations upstream of Emory River Mile (ERM) 6.0: This reach consists of reference "background" locations where ash deposition was not found in prior sampling.
- Reference location on the Little Emory River: The Little Emory River was added as a reference location for fish sampling.
- Emory Reach C (ERM 3.5 to 6.0): This reach consists of impacted locations upstream of the primary time-critical removal action (Phase 1) dredging operations.
- Emory Reach B (ERM 1.5 to 3.5): This reach consists of sections of the channel that were dredged in a series of "grids" during the primary time-critical removal action. This reach also includes sections of the river outside of the dredged channel.
- Emory Reach A (ERM 0.0 to 1.5): This reach consists of impacted locations downstream of the primary dredging operations. Time-critical dredging was not conducted in this reach due to the presence of cesium-137 in the underlying sediment (TVA 2011).
- Intake Channel: This reach consists of the Kingston Fossil Plant (KIF) intake channel from the skimmer wall to the plant intakes.
- Reference locations upstream of Clinch River Mile (CRM) 4.5: This reach consists of reference "background" locations where ash deposition was not found in prior sampling.
- Clinch Reach B (CRM 3.0 to 4.5): This reach consists of impacted locations in the Clinch River downstream of the primary dredging operations, yet upstream of the KIF discharge.
- Clinch Reach C (CRM 0.0 to 3.0): This reach consists of impacted locations in the Clinch River, downstream of the KIF discharge.

- Tennessee Reach B (Tennessee River Mile [TRM] 566 to 568): This reach consists of potentially impacted locations in the Tennessee River, downstream of the confluence with the Clinch River.
- Tennessee Reach A (TRM 550 to 566): This reach consists of downstream Tennessee River locations where deposition of ash from storm event transport has been predicted to occur (TVA 2011).

Samples of abiotic and biotic media collected from each of these reaches were analyzed for various constituents. Naturally-occurring metals (e.g., arsenic and selenium) and naturally-occurring radionuclides (e.g., radium-226 or thorium-228) are present within the ash and were the primary constituents of interest. Legacy constituents, (e.g., polynuclear aromatic hydrocarbons, polychlorinated biphenyls (PCBs), pesticides (chlordane), mercury, or cesium-137), although not present within the ash, may be present in the river system from other historical sources.

The exposure scenarios evaluated in this risk assessment were for potential current and future receptors. Exposure durations ranged from 6 to 24 years.

- Resident (Adult and Child). Residential receptors may be exposed to surface water via ingestion and dermal contact. This scenario assumes that the resident draws water directly from the river for household use without filtration or treatment, by-passing the available public water supply or installation of a groundwater well. Potential residential exposure to surface water used as a potable water supply was evaluated for all reaches of the Emory, Clinch, and Tennessee Rivers. Exposure parameters for this scenario were the default values established by EPA.
- Recreator (Adolescent-Adult Swimmer). Swimmers may be exposed to ash-related constituents in surface water while swimming in the Emory, Clinch, or Tennessee Rivers. Incidental ingestion and dermal contact with surface water during swimming are the exposure pathways of concern. The potential receptors are assumed to be adults and adolescents who are old enough to be away from parental supervision for extended periods (assumed to be 9 to 18 years old). Exposure parameters for this scenario were the default values established by EPA Region 4. Swimming is assumed to occur 45 days a year with an exposure time of 1.4 hours a day.
- Recreator (Adolescent-Adult Beachcomber). Adolescent or adult recreators or fishers may be exposed to residual ash-impacted sediment during the winter when Watts Bar Reservoir is lowered to winter pool, exposing the sediment. Potential recreational exposure to seasonally exposed sediment was evaluated along all reaches of the Emory River and along Reaches A and B of the Clinch River. Beachcombers may be exposed to residual ash and sediment via incidental ingestion, dermal contact, and external exposure to radionuclides. Inhalation of fugitive dust would be negligible due to the water content of the exposed sediments. The receptors were assumed to be an adult or adolescent living adjacent to the river. Exposure to near shore sediments is assumed to be two days per week from October through March, or 48 days per year.
- Recreator (Fisher). Recreational fishing is known to occur in the Emory and Clinch Rivers; however, subsistence level fish consumption is not known to occur. Currently, there are fish consumption advisories in place for the Emory River and Watts Bar Reservoir; however, it may be assumed that not all potential receptors adhere to the advisories. Therefore, ingestion of recreationally caught fish from the Emory and Clinch Rivers was evaluated. The ingestion rate for recreationally caught fish is from EPA and TDEC guidance. The average fish consumption rate is assumed to be 54 grams/day with an exposure frequency of 350 days per year (approximately equal to two 8-ounce meals per week). To be consistent with TDEC's methods for developing fish consumption advisories, an ingestion rate of 6.5 grams/day was also used. The use of two ingestion rates for the fish consumption scenario allows for the evaluation of the potential for adverse health impacts across the typical range of fish consumption habits. Data

from fish filets were assessed; data from whole body fish were not used in the human health risk assessment. To be consistent with TDEC's methods for developing fish consumption advisories, each fish species was evaluated separately. This conservative approach assumes that the receptor only ingests fish of a single species (e.g., only bass) rather than a mixture of fish, which would be a more likely scenario.

The BHHRA used EPA-derived toxicity values. There are two types of toxicity values: cancer slope factors for evaluating carcinogenic effects and reference doses for evaluating noncarcinogenic effects. The toxicity values were obtained from EPA's IRIS database and the latest version of EPA's regional screening levels tables. Toxicity values for radionuclides were obtained from EPA's website for Preliminary Remediation Goals for Radionuclides.

Risk Characterization Results

Results of the risk characterization indicated no unacceptable cancer risk or noncancer hazard to any human receptor due to exposure to residual ash. Results are summarized below.

<u>Resident</u>

Cancer risk estimates for the adult resident ranged from 9E-06 for the Clinch River reference reach to 2E-04 for Emory River Reach C. Cancer risk estimates for the child resident ranged from 5E-06 for the Clinch River reference reach to 4E-05 for Emory River Reach C. The adult cancer risk estimate exceeded EPA's target risk range only for Emory River Reach C; the constituents of concern (COCs) for this scenario were arsenic and radium-228. Of these, only radium-228 had a cancer risk estimate equal to or greater than 1E04. However, radium-228 was found only in a single sample and is not representative of potential long-term exposures. Potential cancer risks for arsenic were within EPA's target risk range (1E-06 to 1E-04); therefore, there are no COCs for residential use of surface water.

Noncancer hazard indices for the resident ranged from 0.1 to 0.5 for the adult and 0.3 to 1 for the child. The child hazard index exceeded unity only for Emory River Reach C. The COCs were inorganic arsenic and manganese, which impact different target organs; additivity of noncancer effect is not likely to occur. Therefore, there are no COCs for residential use of surface water due to noncancer effects.

<u>Recreator (Swimmer)</u>

Cancer risk estimates for the adult swimmer ranged from 5E-08 for the Emory River reference reach to 9E-07 for Emory River Reach C. Cancer risk estimates for the adolescent swimmer ranged from 3E-08 for the Clinch River reference reach to 4E-07 for Emory River Reach C. Cancer risk estimates are within or below EPA's target risk range; therefore, there are no COCs for recreational exposure to surface water.

Noncancer hazard indices for the swimmer ranged from 0.003 to 0.01 for the adult and 0.004 to 0.02 for the adolescent. Hazard indices do not exceed unity; therefore, there are no COCs for recreational exposure to surface water due to noncancer effects.

<u>Recreator (Beachcomber)</u>

Cancer risk estimates for the adult beachcomber ranged from 5E-06 for the Emory River reference reach to 3E-05 for Emory River Reach B. Cancer risk estimates for the adolescent beachcomber ranged from 2E-06 for the Emory River reference reach to 1E-05 for both Emory River Reach B and Clinch River Reach B. Cancer risk estimates are within or below EPA's target risk range; therefore, there are no COCs for recreational exposure to seasonally exposed sediment.

Noncancer hazard indices for the beachcomber ranged from 0.02 to 0.2 for the adult and 0.04 to 0.3 for the adolescent. Hazard indices do not exceed unity; therefore, there are no COCs for recreational exposure to seasonally exposed sediment due to noncancer effects.

Recreator (Fisher)

Cancer risks and noncancer hazards were evaluated separately for consumption of largemouth bass, channel catfish, sunfish (combination of bluegill and redear sunfish), and white crappie. Cancer risk estimates for adult fish consumption ranged from 7E-05 for consumption of bass from the Emory River Reference Reach to 7E-04 for consumption of channel catfish from Emory River Reach C. Cancer risk estimates for child fish consumption ranged from 6E-05 for consumption of bass from the Emory River Reference Reach to 7E-04 for consumption of channel catfish from Emory River Reach C. Cancer risk estimates for adult and child consumption of sunfish were not calculated; because there were no carcinogenic COPCs detected in sunfish filet samples. Cancer risk estimates for adult and child consumption of largemouth bass, channel catfish, and white crappie were within or exceeded EPA's target cancer risk range. COCs for these fish species include arsenic, various pesticides, and PCBs. Of these, only PCBs had cancer risk estimates equal to or greater than 1E-04. Arsenic in fish filet samples was evaluated using data for detected inorganic arsenic species (arsenite). Arsenic speciation data demonstrates that for the majority of samples arsenic is in the less toxic organic form. Potential cancer risks from arsenic are at the lower end of EPA's target risk range (i.e., 1E-06 to 1E-04). Pesticides and PCBs are legacy constituents in the river system that are not ash-related.

Noncancer hazards were also evaluated separately for each of the four types of fish. Hazard indices for adult fish consumption ranged from 0.7 for consumption of crappie from the Clinch River Reach A to 10 for of consumption of largemouth bass from Emory River Reach C. Hazard indices for child fish consumption ranged from 3 for consumption of crappie from the Clinch River Reach A to 46 for consumption of largemouth bass from Emory River Reach C. While noncancer COCs varied by type of fish and reach of the river, only mercury and PCBs had individual hazard quotients equal to or greater than 1. The noncancer effects of other COCs are based on impacts to different target organs, and additivity of effects is not likely to occur. PCBs and mercury are legacy constituents in the river system that are not ash-related.

Cancer risk and noncancer hazard estimates for fish consumption were also calculated using a 6.5 grams/day ingestion rate consistent with the method used by TDEC for development of fish consumption advisories. Cancer risk estimates for adults and children are all within EPA's target risk range; therefore, there are no COCs for consumption of fish under this scenario. Noncancer hazard indices for adult consumption of fish were equal to or below 1 for all fish species and river reaches with the exception of bass from Emory River Reach C. COCs are mercury and PCB-1254, which had individual hazard indices greater than 1. Noncancer hazard indices for child ingestion of fish exceeded unity for bass and catfish for all Emory and Clinch River reaches. The noncancer COCs are mercury and PCBs. Mercury and PCBs are legacy constituents in the river system that are not ash-related.

1 INTRODUCTION

This Baseline Human Health Risk Assessment (BHHRA) presents the results of the BHHRA for the *Kingston Ash Recovery Project Non-Time Critical Removal Action River System Engineering Evaluation/Cost Analysis* (EE/CA) (TVA 2012). A Sampling and Analysis Plan (SAP) for the river system was prepared in May 2010 to define the required sampling and analysis (Jacobs 2010). Results of that sampling and analysis are evaluated in this BHHRA.

On December 22, 2008, approximately 5.4 million cubic yards of ash material were released into the Swan Pond Embayment and adjacent Emory River. In response to this release, TVA undertook immediate response actions and worked in close coordination with the U.S. Environmental Protection Agency (EPA), Tennessee Department of Environment and Conservation (TDEC), and other agencies to provide for the safety of area residents, to contain released ash and minimize its downriver migration, and to monitor and assess air and water quality. On January 12, 2009, TDEC issued a Commissioner's Order to TVA requiring the comprehensive assessment, cleanup and restoration of areas impacted by the release (TDEC 2009). On May 11, 2009, an Administrative Order and Agreement on Consent (EPA Order) was signed between EPA and TVA providing the regulatory framework for the removal actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (EPA 2009). TVA undertook time-critical actions to achieve short-term strategic Site objectives defined in the EPA Order. These actions included hydraulic and mechanical dredging of ash from the Emory River, mechanical excavation of ash from the Swan Pond Embayment, dewatering and processing of the recovered ash, loading of the dewatered ash into railcars, transport of the ash via rail offsite, and ultimate disposal of the ash at the Arrowhead Landfill in Perry County, Alabama.

The objective of the BHHRA was to develop quantitative and qualitative estimates of potential cancer risks and noncancer hazards for human receptors exposed to environmental media impacted by ash west of Dike 2. These estimates were developed to support the evaluation of alternatives for cleanup of any residual ash as part of a Non-Time Critical Removal Action EE/CA for the river system. Risks to potential current and future receptors were evaluated. The risk analysis was based on analytical data collected in 2010 and 2011 from surface water, seasonally-exposed sediment, and fish tissue (fillet) sampling.

Sampling was planned within different sections or reaches of the river system, as shown on Figure 1. These ten reaches are described below.

- Reference locations upstream of Emory River Mile (ERM) 6.0: This reach consists of reference "background" locations where ash deposition was not found in prior sampling.
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- Emory Reach A (ERM 0.0 to 1.5): This reach consists of impacted locations downstream of the primary dredging operations. Time-critical dredging was not conducted in this reach due to the presence of cesium-137 in the underlying sediment (TVA 2011).

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- Tennessee Reach B (Tennessee River Mile [TRM] 566 to 568): This reach consists of potentially impacted locations in the Tennessee River, downstream of the confluence with the Clinch River.
- Tennessee Reach A (TRM 550 to 566): This reach consists of downstream Tennessee River locations where deposition of ash from storm event transport has been predicted to occur (TVA 2011).

Samples of abiotic and biotic media collected from each of these reaches were analyzed for various constituents. Naturally-occurring metals (e.g., arsenic, copper, selenium, or vanadium) and naturally-occurring radionuclides (e.g., radium-226 or thorium-228) are present within the ash and were the primary constituents of interest. Legacy constituents, (e.g., polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, mercury, or cesium-137), although not present within the ash, may be present in the river system from other historical sources.

The BHHRA approach follows EPA guidance including:

- *Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part A)*, EPA/540/1-89/002, (EPA 1989).
- *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors, Interim Final*, Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-03, (EPA 1991a).
- *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals),* OSWER Directive 9285.7-01B, (EPA 1991b).
- *Guidance for Data Usability in Risk Assessment*, OSWER 9285.7-09, (EPA 1992a).
- *Soil Screening Guidance: Technical Background Document*, EPA/540/R-95/128, (EPA 1996).
- *Exposure Factors Handbook*, EPA/600/P-95/002Fa, (EPA 1997).
- *Supplemental Guidance to RAGS: Region IV Bulletins, Human Health Risk Assessment*, (EPA 2000a).
- *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)*, OSWER Directive 9285.7-47, (EPA 2001).
- *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites*, (EPA 2002a).
- *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*, OSWER Directive No. 9285.6-10, (EPA 2002b).

- *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*, OSWER 9355.4-24, (EPA 2002c).
- *Human Health Toxicity Values in Superfund Risk Assessments*, OSWER Directive 9285.7-53, (EPA 2003).
- *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final*, OSWER 9285.7-02EP, (EPA 2004b).
- *Exposure Factors Handbook*, EPA/600/R-090/052F, (EPA 2011a).
- Integrated Risk Information System (IRIS) Database, (EPA 2011b).

Risk assessment as defined in the CERCLA process consists of (1) data evaluation, (2) exposure assessment, (3) toxicity assessment, and (4) risk characterization. An uncertainty analysis was completed at the conclusion of the risk assessment.

1.1 DATA EVALUATION

Data from surface water, seasonally-exposed sediment, and fish fillet samples collected by TVA in 2010 and 2011 under the SAP (Jacobs 2010) were used in the quantitative risk assessment. The data evaluation consisted of four components: (1) review of analytical data adequacy, (2) identification of site related constituents, and (3) identification of constituents of potential concern (COPCs).

1.1.1 Review of Analytical Data Adequacy

The primary purpose of the analytical data review is to verify that environmental data of acceptable quality and quantity are used in the risk assessment. Guidance for evaluating the usability of environmental analytical data for risk assessments is provided by EPA in *Guidance for Data Usability in Risk Assessment* (EPA 1992a, 1992b).

The risk assessment used only data that were generated using analytical methods that unambiguously identify and confirm the presence of an element or compound, provide a reliable quantification of the concentration present, and are supported by a high level of quality assurance documentation. Quality checks incorporated into the analytical methods were performed by the laboratories to generate definitive data and to document issues that might impair the quality or usability of the resulting data, such as instrumental problems, bias in the data, or contamination introduced in the laboratory. Data were inspected further for analytical quality problems during data validation. Evaluation of data quality checks such as instrument calibrations, blank analysis, spike recoveries, etc., were reported in data validation memoranda and appropriate qualifier flags were applied to the data in accordance with the *Quality Assurance Project Plan for the Tennessee Valley Authority Kingston Ash Recovery Project* (QAPP) (TVA 2010), hereinafter referred to as the TVA-KIF-QAPP. Data adequacy was also evaluated through review of the TVA-KIF-QAPP, chain-of-custody (CoC), and other inputs beyond data validation, per *Data Quality Assessment: A Reviewer's Guide* EPAQA/G-9R (EPA/240/B-06/002) [EPA 2006].

Analytical results were documented in data summary reports that discuss overall data quality and any resulting limitations on the use of the data. Data completeness was reviewed to confirm that the available data adequately represent the site spatially (locations sampled) and statistically (sufficient number of values available to have an acceptable level of confidence in the data set). Data that were rejected by the validator for failure to pass a quality check or for noncompliance with the requirements of the TVA-KIF-QAPP were not used in the risk assessment.

Potential health effects from exposure to some constituents may occur at concentrations lower than current analytical technology can measure. In project planning, analytical methods were chosen to provide sufficient analytical sensitivity to detect potentially harmful analytes at concentrations below the levels of concern, or, if this was not possible, at concentrations as low as can be practicably achieved. The potential impact on the risk estimates is addressed in the uncertainty analysis.

Analytical data generated for the Kingston Ash Recovery Project underwent a critical quality assurance (QA) review as specified in the TVA-KIF-QAPP. The summary below provides:

- A description of the laboratory deliverables reviewed.
- The level of review (verification and validation).
- The quality control (QC) measures included in the review.
- Summary tables representing the overall data quality.

For the Kingston Ash Recovery Project, TVA's contracted laboratories submitted three types of deliverables:

- A limited (Level 1) data package containing sample results and batch QC sample results.
- A fully-documented (Level 4) data package including raw data for all analyses.
- Electronic data deliverables (EDDs) for storage in TVA's EarthSoft EQuIS® database.

Electronic data were stored and hosted in a Microsoft SQL database using the EQuIS Enterprise SQL server data schema. Security of the data was maintained using SQL server roles and assigning user names and passwords appropriately.

EDDs were subjected to completeness and correctness testing during loading to TVA's EQuIS database; once loaded to the EQuIS database, the data were subjected to verification. As defined in the TVA-KIF-QAPP, data verification involved comparison of the data loaded in the EQuIS database to the results reported in the Level 1 data package and reconciliation of any discrepancies between these two deliverables. In addition, data verification included review of the batch QC summary forms for compliance with the applicable methods and for data usability with respect to the project data quality objectives (DQOs) presented in the SAP (Jacobs 2010) and the TVA-KIF-QAPP.

Following receipt of the Level 4 data package, data were subjected to validation. As defined in the TVA-KIF-QAPP, data validation included review of raw data and associated QC summary forms for compliance with the applicable methods and for data usability with respect to the appropriate guidance documents. Data validation expands upon the completeness, correctness, and usability assessment performed during verification to include evaluation of instrumental QC analyses, review of sample preparation information, and recalculation of reported results from raw data.

Data validation was performed based on the sample results, summary QC data, and raw data provided by the laboratory. Data validation includes a review of the following QC measures (where applicable):

- Sample condition upon laboratory receipt.
- Initial calibration linearity.
- Blank analysis results greater than the method detection limit (MDL).
- Sample preparation and holding times.
- Inductively coupled plasma/mass spectrophotometer (ICP/MS) tuning.
- Initial calibration verification/continuing calibration verification standard recoveries.
- Inductively coupled plasma interference check standard results (metals only).

- MDLs and linear ranges.
- Internal standard area counts and recoveries.
- Percent moisture/solids.
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries and precision.
- Post-digestion spike recoveries (metals only).
- Laboratory and field duplicate precision.
- Quantitation of positive results.
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries and precision.
- Serial dilution results (metals only).
- Analytical sequence.
- Total vs. dissolved analyte results.
- Reporting limit (RL) standard recoveries (metals only).
- MDL verification standards (metals only).
- Standard reference material recoveries (metals in biological samples only).
- Dual analytical column precision (organics only).
- Retention times (organics only).
- DDT [dichlorodiphenyltrichloroethane]/endrin breakdown (organics only).
- Surrogate recoveries (organics only).
- Qualitative identification (organics only).
- Gas chromatograph/mass spectrometer tuning and system performance (organics only).
- Background checks (radionuclides only).
- Chemical yields (radionuclides only).
- Centroid checks (radionuclides only).
- Efficiency checks (radionuclides only).

The purpose of analytical data validation was to segregate unacceptable data and to qualify data based on data quality limitations identified during validation. In addition to the laboratory QA review, the Level 4 data packages were evaluated and validated for the following:

- Compliance with requested testing requirements.
- Completeness with respect to the TVA-QAPP Level 4 data package deliverables requirements.
- Reporting accuracy (including hardcopy to EDD).
- Confirmation of receipt of requested items.
- Traceability, sensitivity, and usability of the data.

In addition to the review items specified above, the data were validated with guidance from:

- EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA-540-R-08-01 (June 2008).
- National Functional Guidelines for Inorganic Data Review (EPA 2004a).
- EPA Region 4 Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (Rev. 2.1; July 1999).
- EPA Region 4 Data Validation Standard Operating Procedure for Organic Analysis (Revision 3.1, June 2008).
- EPA Region 4 Data Validation Standard Operating Procedure (SOP).

These EPA data validation guidelines are not completely applicable to EPA and SW-846 analytical methods referenced by the laboratories performing the analyses; consequently, professional judgment was used to evaluate data usability. Table 1-1 lists the methods referenced by the contract laboratories for the samples analyzed.

Table 1-1. Constituent Class and Methods Used for Sample Analysis

Constituent Class	Method(s)
Organics	SW-846 Method 8270C Selective Ion Monitoring SW-846 Method 8082 SW-846 Method 8081A
Metals	SW-846 Methods 6010B and 6020A EPA Methods 200.7 and 200.8 SW-846 Methods 7470A and 7471A
Metals Species	SW-846 Method 7199 EPA Method 1632 EPA Method 1638 EPA Method 1630 EPA Method 1631
General Chemistry	Standard Methods (SM) 2540B, C, and D SM 5310B SM 2340B EPA Method 300.0 EPA Method 350.1 EPA 160.3 Walkley-Black Method
Physical Characteristics	ASTM D2974
Radionuclides	HASL 300 EPA Method 901.1 EPA Method 904.4/SW-846 Method 9320 Modified EPA Method 903.1 Modified

Notes:
ASTM = American Society for Testing Materials
HASL = Health and Safety Laboratory

Analytical data from the contracted laboratories were qualified with guidance from the National Functional Guidelines and Region 4 Data Validation SOPs previously referenced. The data validation qualifiers listed below were applied to project samples based on the reviews conducted.

Organic Data Validation Qualifiers

U	This result should be considered "not detected" because it was detected in an associated field or laboratory blank at a similar level
R	Unreliable positive result; compound may or may not be present in sample
UR	Unreliable reporting or detection limit; compound may or may not be present in sample
J	Quantitation is approximate due to limitations identified during data validation
UJ	This compound was not detected, but the reporting or detection limit should be considered estimated due to a bias identified during data validation

Inorganic Data Validation Qualifiers

U	This result should be considered “not detected” because it was detected in an associated field or laboratory blank at a similar level
R	Unreliable positive result; analyte may or may not be present in sample
UR	Unreliable reporting or detection limit; analyte may or may not be present in sample
J	Quantitation is approximate due to limitations identified during data validation
UJ	This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation

As specified in the TVA-KIF-QAPP (Section 22.0), the data produced during the sampling tasks included in the field investigation are compared with the defined QA objectives and criteria for precision, accuracy, representativeness, completeness, and comparability (PARCC) and sensitivity. The goal of these comparisons is to check that the data reported are representative of actual conditions at the site.

Standard procedures are used so that known and acceptable levels of PARCC are maintained for each data set. Descriptions of these criteria are presented in the following subsections.

Precision

Precision is the degree of agreement between the numerical values of a set of duplicate samples performed in an identical fashion constitutes the precision of the measurement.

Analytical precision is calculated by expressing, as a percentage, the relative percent difference (RPD) between results of analyses of laboratory duplicate samples for a given analyte. Precision is expressed as an RPD when both results are greater than 5 times the RL. When at least one result is less than five times the RL, the difference between the results is used to evaluate precision. A summary of the field duplicate collection is provided in Table 1-2.

Table 1-2. Field Duplicate Precision Summary

Matrix	No. of Field Duplicate Pairs Collected	Percent of Acceptable Results
River Surface Water	21	99%
Seasonally-Exposed Sediment	6	80%
Fish Tissue	0	NA

In general, acceptable precision and sample representativeness were demonstrated by the reported results in the surface water field duplicate pairs with the exceptions noted in Table 1-3. The results presented in Table 1.3 were outside the acceptance criteria for surface water field duplicate pairs specified in the TVA-KIF-QAPP (i.e., the RPD between the results was less than 20% when both results were less than 5 times the RL or the difference between the results was less than the RL when at least one result was greater than 5 times the RL).

Table 1-3. Field Duplicate Precision Exceedances for Surface Water

Method	Analyte	No. of FD Pairs Outside Acceptance Criterion	Maximum Relative Percent Difference
EPA 1632 Mod	Arsenate	1	26%
EPA 200.7/SW846 6010	Aluminum	1	27%
	Iron	4	20%
EPA 200.8/SW846 6020	Manganese	2	*< 5x RL*

In general, acceptable precision and sample representativeness were demonstrated by the reported results in the seasonally-exposed sediment field duplicate pairs with the exceptions noted in Table 1-4. The results presented in Table 1-4 were outside the acceptance criteria for sediment field duplicate pairs specified in the TVA-KIF-QAPP (i.e., the RPD between the results was less than 35% when both results were greater than 5 times the RL or the difference between the results was less than 2 times the RL when at least one result was less than 5 times the RL).

Table 1-4. Field Duplicate Precision Exceedances for Seasonally-Exposed Sediment

Method	Analyte	No. of Field Duplicate Pairs Outside Acceptance Criterion	Relative Percent Difference
EPA 1630	Methyl mercury	1	61.1%
SW846 6010	Aluminum	1	47.7%
	Potassium	1	*< 5x RL*
SW846 8270 SIM	Benzo(a)anthracene	1	62.0%
	Benzo(a)pyrene	1	51.1%
	Benzo(b)fluoranthene	1	48.6%
	Benzo(g,h,i)perylene	1	72.1%
	Benzo(k)fluoranthene	1	47.1%
	Benzo[e]pyrene	1	59.1%
	C1-Chrysenes	1	41.4%
	C1-Fluoranthenes/Pyrenes	1	63.4%
	C1-Naphthalenes	1	85.7%
	C1-Phenanthrenes/Anthracenes	1	62.8%
	C2-Chrysenes	1	77.8%
	C2-Fluoranthenes/Pyrene	1	90.0%
	C2-Naphthalenes	1	80.7%
	C2-Phenanthrenes/Anthracenes	1	59.7%
	C3-Chrysenes	1	*< 5x RL*
	C3-Fluoranthenes/Pyrene	1	46.2%
	C3-Fluorenes	1	*< 5x RL*
	C3-Naphthalenes	1	72.0%
	C3-Phenanthrenes/Anthracenes	1	63.2%

Method	Analyte	No. of Field Duplicate Pairs Outside Acceptance Criterion	Relative Percent Difference
	C4-Naphthalenes	1	66.7%
	C4-Phenanthrenes/Anthracenes	1	69.6%
	Chrysene	1	57.1%
	Fluoranthene	1	53.7%
	Indeno(1,2,3-cd)pyrene	1	66.7%
	Naphthalene	1	*< 5x RL*
	Perylene	1	57.6%
	Phenanthrene	1	66.7%
	Pyrene	1	60.9%
Walkley-Black	Total Organic Carbon	1	*< 5x RL*

For sediment samples, it should be noted that the field duplicate samples were co-located sediment cores. Higher variability is expected for co-located samples than for true field duplicate pairs.

Precision is evaluated by analysis of MS/MSD, LCS/LCSD, or laboratory duplicates. In general, acceptable precision was consistently observed for the sample matrices and parameters included in the EE/CA dataset. Individual results qualified as estimated as a result of analytical imprecision were detailed in the data validation reports issued to TVA.

<u>Accuracy</u>

Accuracy is the degree of agreement of a measurement, X, with an accepted reference or true value, T. Accuracy, which is a measure of the bias in a system, is assessed by means of reference samples and percent recoveries. Error may arise due to personal, instrumental, or method factors.

Analytical accuracy is assessed using surrogate compounds, LCS, MS/MSD, and selection reaction monitoring analysis. Analytical accuracy is expressed as the percent recovery (%R) of an analyte that has been added to the control sample or a standard matrix (e.g., blank, soil) at a known concentration prior to analysis.

Acceptable accuracy was observed for most sample matrices and parameters included in the EE/CA dataset. Very low recoveries were observed for hexavalent chromium in some sediment MS analyses and very low recoveries were observed for semivolatile organic surrogate compounds in some sediment samples, which resulted in rejection of data as summarized in Table 1-5. Individual results qualified as estimated or rejected as a result of analytical inaccuracy were detailed in the data validation reports issued to TVA.

<u>Completeness</u>

Completeness is a measure of the degree to which the amount of sample data collected meets the needs of the sampling program and is quantified as the relative number of analytical data points that meets the acceptance criteria (including accuracy, precision, and any other criteria required by the specific analytical method used). Completeness is defined as a comparison between actual numbers of usable data points expressed as a percentage of expected number of points.

Difficulties encountered while handling samples in the laboratory, as well as unforeseen complications regarding analytical methods, may affect completeness during sample analysis. As specified in the TVA-KIF-QAPP, the minimum goal for completeness was 90%; the ability to exceed this goal is dependent on the applicability of the analytical methods to the sample matrix analyzed. If data cannot be reported without qualifications, project completion goals may still be met if the qualified data (i.e., data of known quality, even if not perfect) are suitable for specified project DQOs. Percent completeness was expressed as the ratio of the total number of usable results relative to the total number of analytical results. The total number of usable analytical results was the total number of results minus any results deemed unusable (e.g., rejected) at validation.

Table 1-5 presents the completeness percentage of each individual task specified in the EE/CA.

Table 1-5. Summary of Completeness Percentages

Matrix	Analytical Results (Total Count)	Usable – Results that were not Rejected (Total Count)	Percent Usable
Fish Filet – Metals			
Pace	10,409	10,385	>99%
Fish Filet – Non-Metals Analyses (By Laboratory)			
Frontier	630	630	100%
GEL	180	180	100%
Pace	1,248	1,248	100%
Exposed Sediment (By Laboratory)			
TestAmerica Burlington	1,514	1,491	98%
TestAmerica Irvine	19	19	100%
TestAmerica Nashville	1,872	1,872	100%
TestAmerica North Canton	38	38	100%
Frontier	247	247	100%
GEL	342	342	100%
R.J. Lee	7	7	100%
Surface Water (By Laboratory)			
TestAmerica Nashville	10,989	10,987	>99%
Frontier	460	460	100%
GEL	900	900	100%

Note: For definitions, see the Acronyms list.

Representativeness

Representativeness expresses the degree to which sample data are accurate and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter associated with the proper design of the sampling program. The representativeness criterion can, therefore, be met through the proper selection of sampling locations, the collection of a sufficient number of samples, and the use of EPA-approved and standardized sampling procedures to describe sampling techniques and the rationale used to select sampling locations to ensure representativeness of the sample data.

Representativeness was also measured by the collection of field duplicates or co-located samples, as appropriate given the sample matrix. Comparison of the analytical results of field duplicates will provide a direct measure of individual sample representativeness. In general, field duplicate analyses demonstrated acceptable sample representativeness for all matrices and parameters included in the EE/CA dataset. Individual results qualified as estimated or rejected as a result of analytical inaccuracy were detailed in the data validation reports issued to TVA.

Comparability

Comparability is a qualitative parameter used to express the confidence with which one data set can be compared with another. The comparability of the data, a relative measure, is influenced by sampling and analytical procedures. By providing specific protocols for obtaining and analyzing samples, data sets should be comparable regardless of who collects the sample or who performs the sample analysis.

The laboratory was responsible providing the following controls to allow assessment of comparability:

- Adherence to current, standard EPA-approved methodology for sample preservation.
- CoC records that accompanied samples to the analytical laboratory have very specific method and analyte requests. Each CoC contains a method and analyte group (MAG) that indicate to the laboratory which method and grouping of analytes to report. In addition to requiring method and analytes, the MAG, also requires specific units and basis (e.g., wet, dry).
- Compliance with holding times and analysis consistent with TVA-KIF-QAPP.
- Consistent reporting units for each parameter of similar matrices.
- EPA-traceable or National Institute of Standards and Technology (NIST)-traceable standards, when applicable.
- For metals analysis, the Kingston Ash Recovery project instituted project MDLs to which all samples were reported. The project MDLs were set at the higher value between the Code of Federal Regulations, Title 40, Part 136 MDLs and an evaluation of the blanks, represented as "3 sigma × the average of the blank results." With each analytical sequence, the laboratory verified that it could "see" and report to the project MDLs by analyzing a series of MDL verification standards spiked at 1×, 2×, and 3× the project MDL.

In general, the analytical laboratories met the requirements above to generate comparable data. Individual sample results qualified as estimated due to exceeded analytical holding times were detailed in the data validation reports issued to TVA. In addition, MDLs for specific results were raised in the project database when MDL verification standard acceptance criteria were not met.

Data Quality

In general, the data met the DQOs defined for these tasks and are acceptable for use. Table 1-6 summarizes the data quality based on the verification and validation that was performed and as compared to the data quality measures identified in the TVA-KIF-QAPP. One of the TVA project data quality objectives was to collect enough data of sufficient quality to be used in a quantitative risk assessment, with a high degree of confidence. On the basis of the amount of complete data (>95%), the low amount of data qualified for precision and/or accuracy reasons and the demonstrated achievement of analytical sensitivity, the TVA data set is acceptable for use for quantitative risk assessment activities. The only limitation with regard to using the project data for risk assessment is the small percentage of data that are qualified as discussed in the individual data validation reports.

Table 1-6. Summary of Data Quality

Matrix	Laboratory	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
Metals										
Filet	Pace	10,409	8,336	*80%*	1,967	*19%*	82	*1%*	24	*<1%*
Non-Metals										
Fish Filet	Pace	1,248	1,173	*94%*	75	*6%*	0	*0%*	0	*0%*
	Frontier	630	126	*20%*	402	*64%*	102	*16%*	0	*0%*
	GEL	180	180	*100%*	0	*0%*	0	*0%*	0	*0%*
Seasonally-Exposed Sediment	TestAmerica Burlington	1,514	1,067	*70%*	424	*28%*	0	*0%*	23	*2%*
	TestAmerica Irvine	19	17	*89%*	2	*11%*	0	*0%*	0	*0%*
	TestAmerica Nashville	1,872	1,474	*79%*	398	*21%*	0	*0%*	0	*0%*
	TestAmerica North Canton	38	29	*76%*	5	*13%*	4	*11%*	0	*0%*
	Frontier	247	109	*44%*	132	*53%*	6	*2%*	0	*0%*
	GEL	342	339	*99%*	3	*1%*	0	*0%*	0	*0%*
	R.J. Lee	7	7	*100%*	0	*0%*	0	*0%*	0	*0%*
Surface Water	TestAmerica Nashville	10,989	8,518	78%	2,348	21%	121	1%	2	<1%
	Frontier	460	307	68%	153	33%	0	0%	0	0%
	GEL	900	878	98%	0	0%	22	2%	0	0%

Note: For definitions, see the Acronyms list.

1.1.2 Identification of Site Related Constituents

EPA defines COPCs as "Constituents that are potentially site-related and whose data are of sufficient quality for use in the quantitative risk assessment" (EPA 1989). These constituents may contribute significantly to human or ecological risk and are carried through the risk assessment process. All detected constituents were included in the risk assessment.

Coal Combustion Byproducts

The burning of coal in coal-fired power plants generates coal combustion byproducts including fly ash, bottom ash, boiler slag, and flue gas desulfurization gypsum. EPA has identified 41 common constituents of coal combustion byproducts, including 23 metals and 14 inorganic ions, but no organic compounds. The trace metals commonly found in fly ash, by relative frequency are vanadium, zinc, copper, chromium, nickel, lead, arsenic, and mercury (EPA 2008, 1999a). Selenium and thallium were identified by the EE/CA Technical Working Group as additional constituents in fly ash that are of interest in both human health and ecological risk assessment. Additionally, ash is known to contain naturally-occurring radionuclides, specifically isotopes of uranium, thorium, and potassium, and their short-lived daughter products (e.g., radium). Therefore the 10 metals and the naturally-occurring radionuclides are considered constituents of interest and were carried forward in the human health risk assessment.

Frequency of Detection

Each constituent in each medium was evaluated to determine its frequency of detection (Tables 2.1 through 2.45 [Appendix B]). Frequency of detection is evaluated in the uncertainty analysis (Section 1.5.1). Frequency of detection was not used to eliminate COPCs.

Background Concentrations

EPA Region 4 Risk Assessment Bulletins state: "For naturally-occurring inorganics and radionuclides, compare the onsite maximum detected concentration to two times the average site-specific background concentration (EPA 2000a). Eliminate the constituent as a COPC if it is less than two times the background level. It should be noted that one background sample, if elevated, is usually not acceptable for comparison or elimination purposes." For this risk assessment, background screening was not used to eliminate COPCs.

1.1.3 Identification of Constituents of Potential Concern

Surface water samples were analyzed for total and dissolved metals, radionuclides, and arsenic, selenium, and chromium speciation. Seasonally-exposed sediment samples have been analyzed for total metals, radioisotopes, pesticides, PCBs, PAHs, metal species, polarized light microscopy, total organic carbon, and grain size. Fish fillet samples were analyzed for metals, arsenic speciation, radioisotopes, pesticides, and PCBs. Tables 2.1 through 2.45 (Appendix B) provide the occurrence, distribution, and selection of COPCs in this assessment. All detected constituents were carried through the human health risk assessment.

1.2 EXPOSURE ASSESSMENT

The term "exposure pathway" describes the mechanism by which an individual or population may be exposed to constituents originating from an area of contamination. An exposure pathway analysis links the sources, locations, and types of environmental releases with population locations and activity patterns to determine the potential human exposure pathways. An exposure pathway generally consists of five elements: (1) a source and mechanism of constituent release, (2) transport medium (or media in cases involving media transfer of constituents), (3) a point of potential human contact with the contaminated media, (4) an exposure route at the point of contact, and (5) a receptor. Identification of exposure pathways of concern is determined by evaluating the components necessary to complete a potential exposure pathway. For an exposure pathway to be considered complete, each of these components must exist and be linked to the others. Figure 2 (Appendix A), conceptual site model, illustrates the environmental pathways by which receptors could be exposed to constituents associated with the released ash.

1.2.1 Determination of Exposure Point Concentrations

Quantification of exposure provides an estimate of the constituent intake for various exposure pathways identified at the site. To quantify exposure, exposure point concentrations (EPCs) must be determined and constituent intakes calculated for the various exposure pathways identified for the site. Potential receptors are assumed to move randomly across the site spending equivalent amounts of time in each location. Therefore, contact with a contaminated medium over time is best represented by the average concentration of the detected analytes.

The EPC is the representative concentration of a constituent in an environmental medium that is potentially contacted by the receptor (EPA 1989). The EPC is defined as "the arithmetic average of the concentration that is contacted over the exposure period" (EPA 1989). To ensure that the estimate of the average (or mean) is conservative and not underestimated, EPA (1989, 2002b) recommends using an upper confidence limit of the mean (UCL) as an estimate for the EPC (e.g., the 95% UCL). The UCL is a statistical number calculated to represent the mean concentration with a high percent confidence that the true arithmetic mean concentration for a site will be less than the UCL. The high level of confidence (e.g., 95%) is used to compensate for the uncertainty involved in representing site conditions with a finite number of samples.

Samples of surface water were collected at fixed station monitoring locations in the Emory, Clinch, and Tennessee Rivers. TVA had established 10 fixed stations that were monitored during the time-critical removal action. These locations were adjusted to correlate with approximate locations of submerged sediment samples and with historical TVA fish health and bioaccumulation studies and to provide representative measurement of water quality evenly distributed across the study area. An additional sample location was added at ERM 0.3 at the request of the EPA On-Scene Coordinator for the time-critical removal action. The 11 fixed station monitoring locations were sampled once each week for 8 weeks to obtain sufficient quantity of data to demonstrate variability. Data from unfiltered surface water samples were used in this BHHRA.

Samples of seasonally-exposed sediment were collected using hand-auger methods during winter pool months. In general, samples were taken randomly along each shoreline (right and left banks), regardless of particle make-up (ash/native sediment proportion), because the purpose of this sampling was to estimate total residual risk. Sample locations were adjusted based on results of the visual survey to bias the sampling towards depositional areas or visible ash and thereby result in conservative estimates of risk for human receptors.

Fish tissue (i.e., filet) samples were collected from four locations (including one upstream reference location) in the Emory River and from three locations (including one upstream reference location) in the Clinch River. Some of the samples were collected in the spring of 2010 before dredging was completed. The uncertainty associated with including data from these samples is addressed in Section 1.5.1. Samples were collected using a combination of electroshock, gill netting, or other methods as required for obtaining sufficient sample volume for analysis. Samples were collected of three separate fish species (largemouth bass, bluegill, and channel catfish), which are representative of both pelagic and benthic fish communities. Samples of white crappie (a common sport fish) were also collected and included in the risk assessment. To be consistent with TDEC's methods (TDEC 2009) for developing fish consumption advisories, each fish species was evaluated separately. This conservative approach assumes that the receptor only ingest fish of a single species (e.g., only bass) rather than a mixture of fish which is a more likely scenario.

Filet samples of bluegill, largemouth bass, and channel catfish were analyzed in accordance with the SAP for metals and arsenic speciation and a subset of 25% were analyzed for pesticides, PCBs, and radiological constituents. However, due to the mass of specimen required for all the analyses and the small volume of bluegill specimens, only metals and arsenic speciation analyses were possible on the bluegill filet samples. Red ear sunfish and white crappie filet samples included in this evaluation were only analyzed for metals.

Summary statistics for arsenic analyses in fish filet samples are presented in Tables 2.16 through 2.45 in Appendix B. Arsenic speciation results demonstrate that in the majority of samples, inorganic arsenic species are not detected and the total arsenic is in the organic form. However, for one of nine largemouth bass sample from Emory River Reach A and catfish samples from Emory River Reach A (3 of 8 samples), Clinch River Reference Reach (4 of 8 samples), and Clinch River Reach A (3 of 8 samples); the inorganic arsenic species arsenite was the detected form of arsenic. These detections were slightly greater than the method detection limit. For these locations, the maximum detected arsenite concentration is used as the exposure point concentration. Total arsenic data will not be used in the quantitative risk calculations.

Red ear sunfish have feeding habits similar to bluegill but obtain a larger fraction of their diet from mollusks (e.g., snails). White crappie have feeding habits similar to largemouth bass. Therefore, it is assumed that the arsenic speciation results will be similar for these related species. The uncertainty associated with this assumption is discussed in Section 1.5.1.

Data of acceptable quality for use in the risk assessment were treated as follows for identification of EPCs:

- Results from normal/field duplicate sample pairs were treated as follows:
    - The greater of the normal and field duplicate results were used if both are detects.
    - The lower of the detection/quantitation-limit was used if the normal and field duplicate results are both nondetect.
    - The detected value was used when either the normal or field duplicate result was a detect and the other was a nondetect.

- EPCs were set at the lower of the maximum and the upper confidence level on the mean concentration.

- The most current version of EPA's ProUCL software - version 4.1 (EPA 2010b) was used to the calculate UCLs where enough data was available (a minimum of five detections and eight samples).
    - Values for nondetects were included at the quantitation or detection limit reported by the laboratory. ProUCL was allowed to handle nondetect values according to the internal rules of the software.
    - In most cases, the UCL recommended by the software was used.
    - In a few occasions, a UCL was not recommended by the software. In those cases, the RPD for the two values was calculated as the ratio of the absolute difference in UCLs divided by the mean of the UCLs. Where the RPD is low (i.e., the two recommended UCLs were very close), the higher of the two UCLs was conservatively used. An RPD value less than 5% was considered low. Where the RPD was higher than 5%, typically ProUCL recommended two UCLs: the Kaplan-Meier (KM)(% bootstrap) and KM(t). In those cases, a general rule was applied to choose the KM(t) over KM(% bootstrap) for two reasons: (1) Bootstrap methods are typically not reliable when the number of unique values gets small (EPA sets a lower limit of 5 unique values) and (2) EPA's decision rules for left-censored data are clear that for more high degrees of censoring, KM(t) is preferred.

Tables 3.1.RME through 3.45.RME (Appendix B) summarize the EPCs for surface water, seasonally-exposed sediment, and fish.

Results for split samples of fish filets generated by multiple organizations revealed an apparent low bias for mercury data when analyzed by ICP/MS as compared to cold-vapor atomic absorption spectroscopy and direct mercury analysis (DMA). This bias was confirmed by TVA's contracted laboratory through the analysis of multiple standard reference materials by each of the three methodologies. Based on the observed inconsistencies, a study was conducted to evaluate ICP/MS bias compared to DMA data for fish fillet tissue samples.

An analytical plan was developed to evaluate an apparent low bias for mercury results in fish fillet samples analyzed by ICP/MS (SW-846 Method 6020) as compared to the direct mercury analyzer method (SW-846 Method 7473). The analytical results derived under that plan were used to determine an appropriate correction factor to be applied to mercury data for existing fish fillet data determined using ICP/MS analysis. The correction factor was determined to be 1.6. Mercury EPCs in the series 7.RME tables for fish consumption (Appendix B) were increased by multiplying the EPC by 1.6 to incorporate the correction factor.

1.2.2 Exposure Scenarios

Exposure parameters were selected as combinations of average (50^{th} percentile) and upper-bound (95^{th} percentile) values. The selection of exposure parameters result in an estimate of the reasonable maximum exposure (RME) expected to occur. The intent of the RME is to estimate a conservative exposure case that is still within the range of possible exposures (EPA 1989). The exposure scenarios evaluated in this risk assessment were for potential current and future receptors. Exposure durations range from 6 to 24 years. The selection of exposure pathways is summarized in Table 1 (Appendix B) and described below. Exposure parameters are presented in Tables 4.1.RME through 4.4.RME (Appendix B).

1.2.2.1 Surface Water

Recreator (Adolescent-Adult Swimmer)

Adolescent or adult swimmers may be exposed to ash related constituents in surface water while swimming. Incidental ingestion and dermal contact with surface water during swimming are the exposure pathways of concern. The potential receptors for exposure to surface water in the Emory, Clinch, or Tennessee Rivers are assumed to be adults and children who are old enough to be away from parental supervision for extended periods. Exposure parameters for this scenario were the default values established by EPA Region 4 (EPA 2000a). The child age group considered is 9 to 18 years old. For the recreational scenario, swimming in these rivers is assumed to occur 45 days a year. An exposure time of 1.4 hours a day is used for both scenarios based on activity pattern data by the EPA (1997b).

Adult and Child Resident

Future residential receptors may be exposed to surface water via ingestion and dermal contact. Exposure parameters for this scenario were the default values established by EPA (1991a). This scenario assumes that the resident draws water directly from the river for household use without filtration or treatment, by-passing the available public water supply or installation of a groundwater well.

Recreator (Fisher)

Recreational fishing is known to occur in the Emory and Clinch Rivers; however, subsistence level fish consumption is not known to occur. Currently, there are fish consumption advisories in place for the Emory River and Watts Bar Reservoir; however, it may be assumed that not all potential receptors adhere to the advisories. Therefore, ingestion of recreationally caught fish from the Emory and Clinch Rivers were evaluated. Ingestion rates for recreationally caught fish were from the EPA (1991a) for recreationally caught fish and TDEC (2009) for development of fish consumption advisories. The average fish consumption rate of 54 grams/day is the default rate presented in EPA 1991b. This rate was calculated for an exposure frequency of 350 days per year and is approximately equal to two 8-ounce meals per week. To be consistent with TDEC's methods (TDEC 2009) for developing fish consumption advisories, an ingestion rate of 6.5 grams/day was also used. The use of two ingestion rates for the fish consumption scenario allows for the evaluation of the potential for adverse health impacts across the typical range of fish consumption habits. Data from fish filets were assessed; data from whole body fish were not used in the human health risk assessment. To be consistent with TDEC's methods (TDEC 2009) for developing fish consumption advisories, each fish species was evaluated separately. This conservative approach assumes that the receptor only ingest fish of a single species (e.g., only bass) rather than a mixture of fish which is a more likely scenario.

1.2.2.2 Seasonally-Exposed Sediment

Recreator (Adolescent-Adult Recreator or Fisher)

Adolescent or adult recreators or fishers may be exposed to residual ash impacted sediment during the winter when Watts Bar Reservoir is lowered to winter pool potentially exposing ash impacted sediment in the Emory, Clinch, and Tennessee Rivers. Recreational receptors may be exposed to residual ash and sediment via incidental ingestion, dermal contact, and external exposure to radionuclides. Inhalation of fugitive dust would be negligible due to the water content of the exposed sediments. The Clinch River Poplar Creek Remedial Investigation (DOE 1996) assessed receptors for exposure to near shore sediments. The receptors were assumed to be an adult or adolescent living adjacent to the river. Exposure to near shore sediments is assumed to be two days per week from October through March or 48 days per year.

1.2.3 Quantification of Exposure

The basic equations used to calculate cancer risk and noncancer hazard estimates for the identified exposure scenarios are taken from EPA guidance (EPA 1989, 1991b, 2000b, 2002c, and 2004). Values used for daily intake calculations are summarized in Tables 4.1.RME through 4.4.RME in Appendix B for surface water, seasonally exposed sediment, and consumption of fish, respectively.

Ingestion of Surface Water

The ingested dose of COPCs from exposure to surface water was estimated by the following equation:

$$CDI_w = \frac{(C_w)(IR_w)(EF)(ED)}{(BW)(AT)} \qquad \textbf{Eq. A.1}$$

where:

- CDI_w = Chronic daily intake from ingestion of COPC in water (mg/kg-day, calculated)
- C_w = concentration of COPC in water (mg/L)
- IR_W = water ingestion rate (L/day)
- EF = exposure frequency (days/year)
- ED = exposure duration (years)
- BW = body weight (kg)
- AT = averaging time (days)

Dermal Contact with Surface Water

Unlike the methodologies for estimating inhaled or ingested doses of COPCs, which quantify the dose at the barrier membrane (the pulmonary or gastrointestinal mucosa), dermal dose is estimated as the dose that crosses the skin and is systemically absorbed. The absorbed dose of COPC from water was estimated by the following equation (EPA 2004b):

$$DAD = \frac{(DA_{event})(SA)(EV)(EF)(ED)}{(BW)(AT)}$$ **Eq. A.2**

where:

DAD = average dermal absorbed dose of COPC (mg/kg-day, calculated)
DA = dose absorbed per unit body surface area per day (mg/cm^2-day)
SA = surface area of the skin exposed to the medium (cm^2)
EV = event frequency (event/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)

Surface water was not analyzed for legacy constituents, because PAHs, PCBs, and pesticides have low water solubility and partition strongly to sediment particles, making detection in surface water unlikely. Therefore, the absorbed dose per event from water was calculated using the spreadsheet for inorganic constituents that accompanies Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (EPA 2004b) which employs the following equation:

$$\mathrm{DA_{event}} = \mathrm{K_p} \times \mathrm{C_w} \times \mathrm{t_{event}}$$ **Eq. A.3**

where:

DA_{event} = absorbed dose per event (mg/cm-event)
K_p = dermal permeability coefficient of constituent in water (cm/hr)
C_w = constituent concentration in water (mg/cm^3)
t_{event} = event duration (hr/event)

Incidental Ingestion of Sediment

The ingested dose of COPCs in sediment was estimated by the following equation:

$$CDI_{chem} = \frac{(C_{sed})(FI_{sed})(IR_{sed})(EF)(ED)(CF_2)}{(BW)(AT)}$$ **Eq. A.4**

$$I_{rad} = (C_{sed})(FI_{sed})(IR_{sed})(EF)(ED)(CF_3)$$ **Eq. A.5**

where:

CDI_{chem} = Chronic daily intake from ingestion of COPC in sediment (mg/kg-day, calculated)
I_{rad} = ingested dose of radionuclide COPC in sediment (pCi, calculated)
C_{sed} = concentration of COPC in sediment (mg/kg or pCi/g)
FI_{sed} = fraction of exposure attributed to sediment (unitless)
IR_{sed} = ingestion rate of sediment (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
CF_2 = conversion factor (1E-6 kg/mg)
CF_3 = conversion factor (1E-3 g/mg)
BW = body weight (kg)
AT = averaging time (days)

Dermal Contact with Sediment

The absorbed dose of COPCs in sediment were estimated from the following equation (EPA 2004b):

$$DAD = \frac{(DA_{event})(SA)(EF)(ED)}{(BW)(AT)} \qquad \textbf{Eq. A.6}$$

where:

DAD = average dermal absorbed dose of COPC (mg/kg-day, calculated)
DA_{event} = dose absorbed per unit body surface area per day (mg/cm^2-day)
SA = surface area of the skin exposed to sediment (cm^2)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)

Dermal uptake of constituents from sediment assumes that exposure is a function of the fraction of a dermally applied constituent that is absorbed, as calculated from the following equation (EPA 2004b):

$$DA_{event} = (C)(CF_2)(AF)(ABS) \qquad \textbf{Eq. A.7}$$

where:

DA_{event} = dose absorbed per unit body surface area per day for sediment (mg/cm^2-day)
C = concentration of COPC in ash (mg/kg)
CF_2 = conversion factor (1E-6 kg/mg)
AF = ash-to-skin adherence factor (mg/cm^2-day)
ABS = absorption fraction (unitless, constituent-specific)

External Exposure to Radionuclides in Sediment

External exposure to radionuclides in sediment was estimated by the following equation (EPA 2000b):

$$EE_{rad} = C_{sed} \times EF \times ED \times ACF \times [ET_o + (ET_i \times GSF)] \times \frac{1}{CF_4} \qquad \textbf{Eq. A.8}$$

where

EE_{rad} = external exposure dose (pCi-year/g)
C_{sed} = concentration of radionuclide in sediment (pCi/g)
EF = exposure frequency (day/year)
ED = exposure duration (years)
ACF = area correction factor (unitless)
ETo = outdoor exposure time fraction (unitless)
ETi = indoor exposure time fraction (unitless)
GSF = gamma shielding factor (unitless)
CF_4 = conversion factor 365 day/year

Ingestion of Fish

The dose of COPCs from ingestion of fish was estimated by the following equation:

$$CDI_{Fish} = \frac{(C_{Fish})(IR_{Fish})(EF)(ED)}{(BW)(AT)} \qquad \textbf{Eq. A.9}$$

where:

CDI_{Fish} = Chronic daily intake from ingestion of COPC in fish (mg/kg-day, calculated)
C_{Fish} = concentration of COPC in fish (mg/kg)
IR_{Fish} = fish ingestion rate (g/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)

1.3 TOXICITY ASSESSMENT

The purpose of the toxicity assessment is to weigh available evidence regarding the potential for a constituent to cause adverse effects in exposed individuals (hazard identification), and to provide an estimate of the relationship between exposure to the constituent and the likelihood of adverse effects (dose-response assessment). Toxicity is defined as the ability of a constituent to induce adverse effects in biological systems.

The BHHRA used EPA-derived toxicity values. There are two types of toxicity values: reference doses (RfDs) (Table 5.1 [Appendix B]) for evaluating noncarcinogenic effects and cancer slope factors (CSFs) (Tables 6.1 and 6.4 [Appendix B]) for evaluating carcinogenic effects. CSFs and RfDs used in the risk assessment were obtained from EPA's IRIS database and the latest version of the regional screening levels tables (EPA 2011b) that follows EPA's three-tiered hierarchy (EPA 2003):

- Tier 1- EPA's IRIS.
- Tier 2- EPA's Provisional Peer Reviewed Toxicity Values (PPRTV) – The Office of Research and Development/National Center for Environmental Assessment/STSC develops PPRTVs on a constituent specific basis when requested by EPA's Superfund program. PPRTVs are available online at: http://hhpprtv.ornl.gov/.
- Tier 3- Other Toxicity Values – Tier 3 includes additional EPA and non-EPA sources of toxicity information. 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.

CSFs for radionuclides were obtained on-line from http://epa-prgs.ornl.gov/radionuclides/download.html (EPA 2010a). This is EPA's website for Preliminary Remediation Goals for Radionuclides.

1.3.1 Evaluation of Carcinogenicity

A few constituents are known, and many more are suspected, to be human carcinogens. The CSFs and the accompanying weight-of-evidence classification are used to evaluate potential human carcinogenic risks associated with exposures.

In defining the potential carcinogenicity of a constituent to humans, EPA first evaluates the sufficiency of evidence of carcinogenicity from available animal and human data. If there are sufficient quantitative data and adequate understanding of the carcinogenic process, a biologically based model may be developed to relate dose and response data on an agent-specific basis. Otherwise, as a default procedure, a standard model can be used to curve-fit the data. Once the data are evaluated, the constituent is assigned a weight-of-evidence classification. EPA recognizes five weight-of-evidence group classifications for carcinogenicity, which are as follows (EPA 2005):

- Carcinogenic to Humans: indicates strong evidence of human carcinogenicity.

- Likely to be Carcinogenic to Humans: weight of evidence is adequate to demonstrate carcinogenic potential to humans.
- Suggestive Evidence of Carcinogenic Potential: weight of evidence is suggestive of carcinogenicity; a concern for potential carcinogenic effects in humans is raised, but the data are judged not sufficient for a stronger conclusion.
- Inadequate Information to Assess Carcinogenic Potential: data are judged inadequate for applying one of the other descriptors.
- Not Likely to Be Carcinogenic to Humans: available data are considered robust for deciding that there is no basis for human hazard concern.

The weight of evidence narrative developed to characterize potential carcinogenic hazard summarizes results of the hazard assessment and provides a conclusion with regard to human carcinogenic potential. The weight of evidence narrative includes both a conclusion about the weight of evidence of carcinogenic potential and a summary of the data on which the conclusion rests. The narrative explains the kinds of evidence available and how they fit together in drawing conclusions, and points out significant issues/strengths/limitations of the data and conclusions.

EPA derives CSF and unit risk values for carcinogens. CSFs generally represent an upper bound on the average risk in a population or the risk for a randomly selected individual but not the risk for a highly susceptible individual or group. Some individuals face a higher risk and some face a lower risk as a result of variations in sensitivity. The use of upper bounds generally is considered to be a health-protective approach for covering the risk to susceptible individuals, although the calculation of upper bounds is not based on susceptibility data. The CSF defines quantitatively the relationship between dose and response as the plausible upper-bound estimate of the probability of a response (i.e., development of cancer) per unit intake of a potential carcinogen over a lifetime.

The CSF is derived by EPA by selecting the most appropriate data set, extrapolating to lower doses, and determining equivalent human doses for the appropriate route of exposure. A nonlinear extrapolation method can be used for cases with sufficient data to ascertain the mode of action and to conclude that it is not linear at low doses but with insufficient data to support a toxicodynamic model that may be either nonlinear or linear at low doses. Nonlinear extrapolation having a significant biological support may be presented in addition to a linear approach when the available data and a weight of evidence evaluation support a nonlinear approach, but the data are not strong enough to ascertain the mode of action. The CSF is expressed in terms of risk per unit concentration of the constituent (mg) per unit body weight (kg) per unit time (day) or $(mg/kg/day)^{-1}$.

1.3.2 Evaluation of Noncarcinogenic Effects

Noncarcinogenic effects are evaluated by comparing an exposure or intake/dose with an RfD. The RfDs are determined using available dose response data for individual constituents. Scientists determine the exposure concentration or intake/dose, below which no adverse effects are seen, and divide by a safety factor (from 10 to 1,000) to determine the RfD. RfDs are identified by scientific committees supported by EPA.

Chronic RfDs are developed for protection from long-term exposure to a constituent (from 7 years to a lifetime); subchronic RfDs are used to evaluate short-term exposure (from 2 weeks to 7 years) [EPA 1989]. For this BHHRA, all receptors (including the resident child, with an exposure duration of 6 years) were conservatively evaluated by using chronic RfDs.

Toxic effects are diverse and measured in various target body organs (e.g., they may range from eye irritation to kidney or liver damage). EPA is currently reviewing methods for accounting for the difference in severity of effects; however, existing RfDs do not address this issue.

1.3.3 Dermal Toxicity Values

Dermal RfDs and CSFs 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 rather than exposure doses. The dermal CSF is derived by dividing the oral CSF by the GAF. The oral CSF is divided, rather than multiplied, by the GAF because the CSF is expressed as a reciprocal dose. The over- or under-estimation of potential cancer risks or noncancer hazards associated with this approach is addressed in the uncertainty analysis.

1.3.4 Target Organ Toxicity

EPA assumes dose and effect to be additive for noncarcinogenic effects (EPA 1989). This assumption provides the justification for adding the hazard quotients (HQs) or hazard indexes (HIs) in the risk characterization for noncancer effects resulting from exposure to multiple constituents, pathways, or media. However, EPA acknowledges that adding all HQ or HI values may overestimate hazards, because the assumption of additivity is probably appropriate only for those constituents that exert their toxicity by the same mechanism (EPA 1989).

Mechanisms of toxicity data sufficient for predicting additivity with a high level of confidence are available for very few constituents. In the absence of such data, EPA assumes that constituents 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 (EPA 1989). When total HI for all media for a receptor exceeds 1 due to the contributions of several constituents, it is appropriate to segregate the constituents 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, since human environmental exposures are likely to involve near- or sub-threshold doses, the target organ chosen for a given constituent is the one associated with the critical effect. If more than one organ is affected by a given constituent at the threshold, then the affected target organs are selected for this constituent. 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 constituents, 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.

1.3.5 Assumptions used in the Toxicity Assessment

Provisional toxicity values for aluminum, cobalt, iron, and thallium have been used in the risk characterization for these COPCs. The toxicity values for these constituents have larger uncertainties than those with finalized values.

Assumptions made in assigning toxicity values for COPCs for this risk assessment were as follows:

- Arsenic in fish fillet samples was evaluated using the CSF and noncancer reference dose for inorganic arsenic; however, analytical data demonstrate that arsenic in fish fillets is largely in the less toxic organic form.
- Total chromium was evaluated using the toxicity values for mixtures of Chromium III and Chromium VI. Aluminum, cobalt, iron, and thallium were evaluated with provisional toxicity values from the National Center of Environmental Assessment; without these values, hazards could not be quantified for these metals.
- Alpha- and gamma-chlordane were evaluated using the toxicity values for Chlordane.
- Mercury in fish was evaluated using the toxicity values for methylmercury.

1.4 RISK CHARACTERIZATION

Risk characterization integrates the results of the exposure and toxicity assessments to estimate potential cancer risks and noncancer hazards. Carcinogenic risk estimates are expressed in terms of the probability that an individual will contract cancer over a lifetime of exposure and are referred to as the Incremental Lifetime Cancer Risk (ILCR). The ILCR is the potential increased probability that an individual may develop cancer due to exposure to site-related constituents. Cancer risk attributable to exposure from a single constituent or radionuclide by a single exposure route was estimated by multiplying the exposure dose for that constituent through the exposure route by the constituent's CSF. Constituent-specific and radionuclide-specific risks were then summed to determine the total cancer risk associated with each exposure route. Risks for each exposure route of concern were then summed to estimate a total risk for an individual receptor exposed through more than one route at a site. Cancer risks were summed across media (i.e., seasonally exposed sediment and surface water) for the adult and adolescent recreators. The calculated cancer risk estimates were compared to the range specified in the National Oil and Hazardous Substances Pollution Contingency Plan of 1E-06 to 1E-04, or 1 in 1,000,000 to 1 in 10,000 exposed persons developing cancer (EPA 1990). Consistent with EPA (1990) ILCRs below 1E-06 are considered acceptable whereas, ILCRs above 1E-04 are considered unacceptable. The range between 1E-06 and 1E-04 is an area of concern, and any decisions to address ILCRs further in this range, either through additional study or engineered control measures, should account for the uncertainty in the risk estimates.

Noncarcinogenic hazards are expressed in terms of HQs and HIs. An HQ is calculated for each constituent for each exposure route by dividing the exposure dose by the constituent-specific reference dose. An HI is calculated for each exposure route by summing the HQs. HIs for each exposure route are summed to derive a total HI for each scenario. HIs were summed across media (i.e., seasonally exposed sediment and surface water) for the adult and adolescent recreators. An HI greater than 1 has been defined as the level of concern for potential adverse noncarcinogenic health effects (EPA 1989). This approach differs from the probabilistic approach used to evaluate carcinogens. 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 less than the threshold level at which adverse health effects may occur. Additionally, the level of concern does not increase linearly as the reference dose is approached or exceeded because the RfDs do not have equal accuracy or precision and are not based on the same severity of effect. Moreover, hazard quotients are combined for substances with RfDs based on critical effects of varying toxicological significance. Also, RfDs of varying levels of confidence that include different uncertainty adjustments and modifying factors will often be combined (e.g., extrapolation from animals to humans, from lowest-observed-adverse-effect levels [LOAEL] to no-observed-adverse-effect levels [NOAEL], from one exposure duration to another).

Considerable uncertainty is associated with ILCR, HQ, and HI estimates; therefore, ILCRs are presented with one significant figure and HQs and HIs are rounded to the nearest whole number or to one significant figure for values less than one. For example, an HI of 1.49 is rounded to 1 and interpreted to mean that the

HI does not exceed the threshold level of 1 and that occurrence of adverse noncancer effects is unlikely. An HI of 0.19, for example, is rounded to 0.2.

Per EPA Region 4 guidance, constituents of concern (COCs) are COPCs that significantly contribute to a pathway in a exposure scenario for a receptor that either (a) exceeds a 1E-04 cumulative site cancer risk; or (b) exceeds a noncarcinogenic HI of 1 (EPA 2000a). Constituents are not considered to be significant contributors to risk and, therefore, are not COCs if their individual ILCR contribution is less than 1E-06 and their noncarcinogenic HQ is less than 0.1. A 1E-04 cumulative site risk level and an HI of 1 are used as remediation "trigger" levels. The carcinogenic "trigger" represents the summed ILCRs to a receptor when considering all pathways, media, and routes for a given land use scenario. The HI "trigger" represents the total of the HQs of all COPCs in all pathways, media, and routes to which the receptor is exposed. If the HI exceeds 1.0, then more specific HIs should be developed by summing HQs of COPCs with RfDs based on toxic effects on the same target organs; this specific target-organ based HI forms the basis for determining noncarcinogenic COCs.

Detailed calculations of cancer risk and noncancer hazard estimates are presented in Tables 7.1.RME through 7.96.RME (Appendix B). Detailed cancer risk estimates for potential exposures to naturally-occurring radionuclides are presented in Tables 8.1.RME through 8.56.RME (Appendix B). Summaries of the cancer risk and noncancer hazard estimates are presented in Tables 9.1.RME through 9.96.RME (Appendix B). Tables 10.1.RME through 10.57.RME (Appendix B) summarize the cancer risk and hazard estimates for the COCs identified for potential exposures at the Kingston Ash Recovery Project site. Only those scenarios that resulted in cancer risks greater than 1E-04 or hazard indices greater than 1.0 are presented in Tables 10.1.RME through 10.57.RME (Appendix B).

1.4.1 Current and Future Exposure Scenarios

Cancer risk and noncancer hazard estimates were calculated for residents (adult and child), and recreators as described in Section 1.2 and summarized in Tables 1-7 through 1-9.

Table 1-7. Summary of Cancer Risk Estimates and Noncancer Hazard Indices for Residential Use of Surface Water

Reach	Adult		Child	
	ILCR	HI	ILCR	HI
Emory River Reach A	4.E-05	0.3	2.E-05	0.7
Emory River Reach B	3.E-05	0.3	2.E-05	0.8
Emory River Reach C	2.E-04	0.5	4.E-05	1
Emory River Reference Reach	1.E-05	0.3	7.E-06	0.6
Clinch River Reach A	2.E-05	0.2	1.E-05	0.6
Clinch River Reach B	2.E-05	0.2	1.E-05	0.5
Clinch River Reference Reach	9.E-06	0.1	5.E-06	0.3
Tennessee River Reach B	2.E-05	0.2	9.E-06	0.5
Tennessee River Reference Reach	1.E-05	0.2	7.E-06	0.5

Table 1-8. Summary of Cancer Risk Estimates and Noncancer Hazard Indices for Recreational Exposure to Surface Water and Seasonally Exposed Sediment

Reach	Adult		Adolescent	
	ILCR	HI	ILCR	HI
Surface Water				
Emory River Reach A	2.E-07	0.005	1.E-07	0.007
Emory River Reach B	2.E-07	0.006	1.E-07	0.009
Emory River Reach C	9.E-07	0.008	4.E-07	0.02
Emory River Reference Reach	8.E-08	0.01	5.E-08	0.01
Clinch River Reach A	1.E-07	0.004	7.E-08	0.006
Clinch River Reach B	1.E-07	0.004	2.E-07	0.005
Clinch River Reference Reach	5.E-08	0.003	3.E-08	0.004
Tennessee River Reach B	1.E-07	0.007	1.E-07	0.009
Tennessee River Reference Reach	8.E-08	0.005	5.E-08	0.007
Seasonally Exposed Sediment				
Emory River Reach A	1.E-05	0.07	6.E-06	0.1
Emory River Reach B	3.E-05	0.08	1.E-05	0.1
Emory River Reach C	6.E-06	0.02	3.E-06	0.04
Emory River Reference Reach	5.E-06	0.03	2.E-06	0.04
Clinch River Reach A	2.E-05	0.09	8.E-06	0.1
Clinch River Reach B	2.E-05	0.2	1.E-05	0.3

Table 1-9. Summary of Cancer Risk Estimates and Noncancer Hazard Indices for Ingestion of Fish

Reach	Adult		Child	
	ILCR	HI	ILCR	HI
Bass				
Emory River Reach A	1.E-04	3	9.E-05	13
Emory River Reach B	1.E-04	2	9.E-05	8
Emory River Reach C	5.E-04	10	4.E-04	46
Emory River Reference Reach	7.E-05	2	6.E-05	9
Little Emory River	NA	1	NA	5
Clinch River Reach A	2.E-04	5	2.E-04	25
Clinch River Reach B	3.E-04	6	3.E-04	29
Clinch River Reference Reach	2.E-04	4	2.E-04	21
Catfish				
Emory River Reach A	3.E-04	6	3.E-04	27
Emory River Reach B	3.E-04	5	2.E-04	22
Emory River Reach C	7.E-04	2	7.E-04	9
Emory River Reference Reach	4.E-04	7	4.E-04	33

Reach	Adult		Child	
	ILCR	HI	ILCR	HI
Little Emory River	NA	1	NA	6
Clinch River Reach A	2.E-04	5	2.E-04	25
Clinch River Reach B	5.E-04	3	5.E-04	12
Clinch River Reference Reach	4.E-04	9	4.E-04	41
Crappie				
Emory River Reach A	NA	1	NA	6
Emory River Reach B	NA	2	NA	8
Emory River Reach C	NA	NA	NA	NA
Emory River Reference Reach	NA	0.9	NA	4
Little Emory River	NA	1	NA	5
Clinch River Reach A	NA	0.7	NA	3
Clinch River Reach B	NA	NA	NA	NA
Clinch River Reference Reach	NA	2	NA	8
Sunfish				
Emory River Reach A	NA	1	NA	5
Emory River Reach B	NA	1	NA	5
Emory River Reach C	NA	0.8	NA	4
Emory River Reference Reach	NA	1	NA	6
Little Emory River	NA	0.9	NA	4
Clinch River Reach A	NA	1	NA	5
Clinch River Reach B	NA	0.9	NA	4
Clinch River Reference Reach	NA	1	NA	5

Note:
NA = Not applicable, no carcinogenic constituents were detected.

1.4.1.1 Residential Scenario

Potential residential exposure to surface water used as a potable water supply was evaluated for all reaches of the Emory, Clinch, and Tennessee Rivers. Adult cancer risk estimates for this scenario ranged from 9E-06 for the Clinch River Reference Reach to 2E-04 for Emory River Reach C. Child cancer risk estimates for this scenario ranged from 5E-06 for the Clinch River Reference Reach to 4E-05 for Emory River Reach C. The adult cancer risk estimate exceeded EPA’s target risk range only for Emory River Reach C; the COCs for this scenario were arsenic and radium-228. Of these, only radium-228 had a cancer risk estimate equal to or greater than 1E04. However, radium-228 was found only in a single sample and is not representative of potential long-term exposures. Potential cancer risks for arsenic were within EPA’s target risk range (1E-06 to 1E-04); therefore, there are no COCs for residential use of surface water.

Noncancer hazard indices for this scenario ranged from 0.1 to 0.5 for the adult and 0.3 to 1 for the child. Only the child hazard index for Emory River Reach C exceeded unity. However, the HI for individual constituents did not exceed unity and potential noncancer effects of these constituents impact different target organs. Therefore, additivity of effect is not likely to occur and there are no COCs for residential use of surface water due to noncancer effects.

1.4.1.2 Recreational Scenario

Recreator (Swimmer)

Potential recreational exposure to surface water was evaluated for adults and adolescents who swim in the rivers. Adult cancer risk estimates ranged from 5E-08 for the Clinch River Reference Reach to 9E-07 for Emory River Reach C. Adolescent cancer risk estimates ranged from 3E-08 for the Clinch River Reference Reach to 4E-07 for Emory River Reach C. Cancer risk estimates are all within or below EPA's target risk range; therefore, there are no COCs for recreational exposure to surface water.

Noncancer hazard indices for this scenario ranged from 0.003 to 0.01 for the adult and 0.004 to 0.02 for the adolescent. Hazard indices do not exceeded unity; therefore, there are no COCs for recreational exposure to surface water due to noncancer effects.

Recreator (Beachcomber)

Potential recreational exposure to seasonally-exposed sediment was evaluated for adult and adolescent exposure along all reaches of the Emory River and along Reaches A and B of the Clinch River. Adult cancer risk estimates ranged from 5E-06 for the Emory River Reference Reach to 3E-05 for Emory River Reach B. Adolescent cancer risk estimates ranged from 2E-06 for the Emory River Reference Reach to 1E-05 for both Emory River Reach B and Clinch River Reach B. Cancer risk estimates are all within or below EPA's target risk range; therefore, there are no COCs for recreational exposure to seasonally-exposed sediment.

Noncancer hazard indices for this scenario ranged from 0.02 to 0.2 for the adult and 0.04 to 0.3 for the adolescent. Hazard indices do not exceeded unity; therefore, there are no COCs for recreational exposure to seasonally-exposed sediment due to noncancer effects.

Recreator (Fisher)

Adult and child cancer risk from consumption of fish were evaluated for the Little Emory River, and all reaches of the Emory and Clinch Rivers. Cancer risks were evaluated separately for consumption of largemouth bass, channel catfish, white crappie, and sunfish (combination of bluegill and redear sunfish). Adult cancer risk estimates for consumption of largemouth bass ranged from 7E-05 for the Emory River Reference Reach to 5E-04 for Emory River Reach C. Adult cancer risk estimates for consumption of channel catfish ranged from 2E-04 for Clinch River Reach A to 7E-04 for Emory River Reach C. Child cancer risk estimates for consumption of largemouth bass ranged from 6E-05 for the Emory River Reference Reach to 4E-04 for Emory River Reach C. Child cancer risk estimates for consumption of channel catfish ranged from 2E-04 for Clinch River Reach A to 7E-04 for Emory River Reach C. Cancer risk estimates for adult and child consumption of largemouth bass and channel catfish were within or exceeded EPA's target cancer risk range. COCs for these fish species are 4,4'-DDE, 4,4'-DDT, alpha-chlordane, arsenic, heptachlor, PCB-1254, and PCB-1260. Of these COCs, only PCB-1254, and PCB-1260 had cancer risk estimates equal to or greater than 1E-04. Pesticides and PCBs are legacy constituents in the river system that are not ash-related. Adult and child cancer risks were not calculated for white crappie or sunfish because there were no carcinogenic COPCs detected in filet samples for these species. The uncertainties associated with these cancer risk estimates are discussed in Section 1.5.4.

Noncancer hazards were evaluated separately for consumption of largemouth bass, channel catfish, white crappie, and sunfish (combination of bluegill and redear sunfish). Adult HI estimates for consumption of largemouth bass ranged from 1 for the Little Emory River to 10 for Emory River Reach C. Adult HI estimates for consumption of channel catfish ranged from 1 for the Little Emory River to 9 for the Clinch River Reference Reach. Adult HI estimates for consumption of white crappie ranged from 0.7 for the Clinch River Reach A to 2 for Clinch River Reach and Emory River Reach B. Child HI estimates for consumption of largemouth bass ranged from 5 for the Little Emory River to 46 for Emory River Reach C. Child HI estimates for consumption of channel catfish ranged from 6 for the Little Emory River to 41 for the Clinch River Reference Reach. Child HI estimates for consumption of white crappie ranged from 3 for the Clinch River Reach A to 8 for the Clinch River Reference Reach and Emory River Reach B. Only PCB-1254, and mercury had HQ estimates equal to or greater than 1 for adult and child consumption of largemouth bass, channel catfish, white crappie. PCB-1254 and mercury are the only COCs. PCBs and mercury are legacy constituents in the river system that are not ash-related. The uncertainties associated with these HI estimates are discussed in Section 1.5.4.

Adult HI estimates for consumption of sunfish ranged from 0.8 for the Emory River Reach C to 1 for all other Emory River Reaches and the Clinch River Reach A and the Clinch River Reference Reach. However, the HIs for individual constituents did not exceed unity. Potential noncancer effects of the individual constituents impact different target organ therefore, additivity of effect is not likely to occur. Therefore, there are no COCs for adult consumption of sunfish due to noncancer effects. Child HI estimates for consumption of sunfish ranged from 4 for the Emory River Reach C, the Little Emory River, and Clinch River Reach B to 6 for Emory River Reference Reach. Only the HQs for mercury exceed unity in all river reaches. The noncancer effects of the other constituents are based on impacts to different target organs; therefore, additivity of effects is not likely to occur. The only COC for child ingestion of sunfish is mercury. Mercury is a legacy constituent in the river system that is not ash-related. The uncertainties associated with these HI estimates are discussed in Section 1.5.4.

Cancer risk and noncancer hazard estimates for fish consumption were also calculated using a 6.5 g/day ingestion rate consistent with the method used by TDEC for development of fish consumption advisories (Tables 7.97.RME through 7.156.RME and 8.57.RME through 8.76.RME for naturally-occurring radionuclides in Appendix B). Cancer risk estimates ranged from 7E-06 for child consumption of bass from the Emory River Reference Reach to 9E-05 for adult consumption of catfish in Emory River Reach C. Cancer risk estimates under this scenario are all within or below EPA's target risk range; therefore, there are no COCs for consumption of fish under this scenario. There were no carcinogenic COPCs detected in white crappie or sunfish filet samples. Noncancer HIs for adult consumption of fish were below 1 for all fish species and river reaches with the exception of bass from the Clinch River Reference Reach and Emory River Reach C. The only COC is PCB-1254, however, the HI for this constituent is less than 1. Therefore, there are no COCs for adult consumption of fish under this scenario. HIs for child ingestion of fish were equal to or greater than 1 for bass and catfish for most Emory and Clinch River Reaches. The noncancer COCs are mercury, and PCB-1254. Therefore, mercury and PCB-1254 was retained as a COC for bass and catfish. Mercury and PCBs are legacy constituents in the river system that are not ash-related.

1.5 UNCERTAINTY ANALYSIS

The primary purpose of the BHHRA is to determine whether there is a potential threat to human health or the environment that warrants remedial action. The nature of cancer risk and noncancer hazard estimates requires the use of multiple assumptions in their development, including assumptions relative to exposure and site conditions. The information and assumptions used to derive the risk estimates are inherently uncertain. The uncertainties introduced at each stage of the risk assessment process may become magnified when they are combined with other uncertainties in the latter stages of the assessment.

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. The uncertainty analysis is a qualitative assessment of these assumptions and their potential impact on the risk estimates to place the numerical estimates in the proper context; namely, whether the risk assessment process may have over- or under-estimated the hazard and risk levels.

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 reviews the types and, as applicable, the magnitude of the uncertainties at each stage of the risk assessment.

Various sources of uncertainty are inherent in the BHHRA. Many of the uncertainties are associated with the use of conservative assumptions to estimate risks and hence are likely to result in an overestimation of potential risks. However, other uncertainties can result in the underestimation of risks. Key areas of uncertainty include:

- Data uncertainties
- Exposure scenario uncertainties
- Toxicity value uncertainties

1.5.1 Data Uncertainties

Although the data evaluation process used to select COPCs adheres to established procedures and guidance, it also requires making decisions and developing assumptions on the basis of historical information and best professional judgment about the data. Uncertainties are associated with such assumptions.

Because of the uncertainty associated with estimating the true average concentration at a site, the representative EPC used is the UCL on the arithmetic mean (EPA 1992b). Statistical tests were performed (using the ProUCL software) to determine which statistical distribution best fits the concentration data. Each COPC's UCL concentration was calculated using both detected values and the reported quantitation limit for samples without a detected concentration. ProUCL handled quantitation limits for nondetected analytes as appropriate for the statistical distribution of the data based on the internal rules of the software. ProUCL recommended UCLs were used for all COPCs that had sufficient frequency of detection to allow for calculation of a valid UCL. The maximum detected concentration was used when a valid UCL could not be calculated or when the UCL exceeded the maximum detected concentration. This method may moderately overestimate the exposure concentration. The use of the maximum detected concentration was typically limited to the analyses for legacy constituent (Pesticides, PCB, PAHs, and radionuclides) for which analyses were only conducted on a subset of the total number of samples. This resulted in an insufficient number of samples for ProUCL to calculate a representative UCL. There are a few instances where an ash-related constituent such as selenium was infrequently detected in a given medium and the maximum detected concentration was used as the exposure point concentration. Exposure point concentrations and the basis for their selection are presented in Tables 3.1.RME through 3.45.RME in Appendix B. When the resulting individual constituent risks are summed to provide a total ILCR or HI, the compounding conservatism of this method for estimating EPCs likely result in an overestimate of the total risk.

Environmental concentrations were assumed to be constant (i.e., concentrations are not reduced by loss due to natural removal processes such as leaching, and/or biodegradation) over the duration of exposure. This assumption has moderate to high uncertainty for surface water and seasonally-exposed sediment. Radium-228 was detected in a single surface water sample in Emory River Reach C, while this constituent cannot be eliminated as a COPC/COC because of the limited number of samples, it is not considered to be representative of potential long term exposures based on the single detection and the sluggish flow resulting from low flow on the Emory River and backflow from the Clinch River. Some unavoidable uncertainty is associated with the constituent concentrations detected and reported by the analytical laboratory. The quality of the analytical data used in the risk assessment depends on the adequacy of the set of procedures that specifies how samples are selected and handled and how strictly these procedures are followed. QA/QC procedures within the laboratories are used to minimize uncertainties; however, sampling errors, laboratory analysis errors, and data analysis errors can occur. Low to moderate uncertainty is associated with the collection, handling, and analysis of samples. Uncertainty associated with samples collected by TVA is minimized by the implementation and adherence to procedures established for the project, selection of analytical methods, audits conducted on the field sampling teams and laboratories, and review and validation of the analytical data packages.

Low uncertainty is introduced into the risk assessment by inclusion of fish filet data from samples collected in the spring of 2010 before dredging was completed. Inclusion of this data likely results in an overestimation of potential human health risk. However, this is not considered to be significant since the major contributors to any unacceptable cancer or noncancer estimates were legacy constituents and not ash-related constituents. Low uncertainty is also introduced into the risk assessment by the assumption that arsenic detected in red ear sunfish and white crappie is in a similar form as that detected in bluegill sunfish and largemouth bass, respectively. Similarity in the feeding habits of these fish species and the conversion of inorganic arsenic to less toxic organic species in fish supports a conclusion of low uncertainty.

1.5.2 Exposure Scenario Uncertainty

The selection of exposure scenarios and parameters was a conservative process that erred on the side of overestimating rather than underestimating potential exposures. Exposure parameters were selected as combinations of average (50^{th} percentile) and upper-bound (95^{th} percentile) values. The selection of exposure parameters result in an estimate of the RME expected to occur under both current and future land-use conditions. The intent of the RME is to estimate a conservative exposure case that is still within the range of possible exposures (EPA 1989).

For each exposure scenario and pathway analyzed in the BHHRA, assumptions were made concerning the exposure parameters (e.g., amount of contaminated media a receptor can be exposed to and intake rates for different routes of exposure) and the routes of exposure. In the absence of EPA-approved default values for exposure parameters, site-specific parameters were used. The selection of exposure parameters was assumed to conservatively represent the potentially exposed populations. All potential constituent exposures were assumed to be from site exposure media (i.e., no other sources contribute to the receptor's health risk).

Moderate to high uncertainty is associated with the exposure scenarios. Local residents are serviced by publically-owned utilities or utilize groundwater for potable water. Therefore, potential exposures to surface water by current and future residents are likely overestimated as the scenario assumes that surface water is used as a potable water supply without filtration or treatment. Potential exposure of recreational receptors to seasonally-exposed sediments are also likely overestimated due to the timing of the potential exposures (i.e., winter) and the extent and composition of exposed sediment in the area. Areas of seasonally-exposed sediment range from gradual slopes with varying amounts of gravel to broad mud flats. The wet, fine-grained substrates of the mud flats make them unsuitable for foot traffic due to its unconsolidated nature.

There is high uncertainty associated with the estimates of cancer risk and noncancer hazards for children consuming fish. The same ingestion rate (54g/d) was applied to both adults and children (age 0 to 6 years). However, according to EPA's Exposure Factors Handbook (EPA 2011a), mean ingestion rates for children range from 6.24 (birth to 1 month) to 24.18 g/d (3 to <6 years). Therefore, the cancer risks and noncancer hazards were likely overestimated by at least 2.25 times.

1.5.3 Toxicity Assessment Uncertainty

Considerable uncertainty is associated with the qualitative (hazard assessment) and quantitative (dose-response) evaluations of a toxicity assessment. Hazard assessment of carcinogenicity is evaluated as a weight-of-evidence determination (EPA 2005). Positive animal cancer test data suggest that humans also contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue response in humans. In the hazard assessment of noncancer effects, positive animal data suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans (EPA 1989).

The CSF for a constituent is a plausible upper-bound estimate of the probability of a response per unit intake of a constituent over a lifetime. It is used to estimate an upper-bound lifetime probability of an individual developing cancer as a result of exposure to a particular level of a potential carcinogen. The CSF is derived by applying a mathematical model to extrapolate from a relatively high, administered dose to animals to the lower exposure levels expected for humans. For radionuclides, ingestion CSF are central estimates from a linear model of the age-averaged lifetime radiation cancer incidence risk per unit of activity ingested. For external exposure to radionuclides in soil, CSFs are central estimates of lifetime radiation cancer risk for each year of exposure to external radiation.

The methods used to develop noncarcinogenic toxicity values (RfD) involve identifying a threshold level below which adverse health effects are not expected to occur. The RfD values are generally based on studies of the most sensitive animal species tested (unless adequate human data are available) and the most sensitive endpoint measured. Uncertainties exist in the experimental data set for such animal studies. These studies are used to derive the experimental exposure representing the highest dose level tested at which no adverse effects are demonstrated (i.e., the NOAEL); in some cases, however, only a LOAEL is available. The RfD are derived from the NOAEL (or LOAEL) for the critical toxic effect by dividing the NOAEL (or LOAEL) by uncertainty factors. These factors usually are multipliers of 10, with each factor representing a specific area of uncertainty in the extrapolation of the data. For example, an uncertainty factor of 100 is typically used when extrapolating animal studies to humans. Additional uncertainty factors are sometimes necessary when other experimental data limitations are found. Because of the large uncertainty factors (10 to 10,000) associated with some RfD toxicity values, exact safe levels of exposure for humans are not known. For noncarcinogenic effects, the amount of human variability in physical characteristics is important in determining the risks that can be expected at low exposures and in determining the NOAEL (EPA 1989).

Quantitative toxicity estimates for dermal exposures have not been developed by EPA; therefore, oral reference doses and oral cancer potency factors were used to assess systemic toxicity from dermal exposures. The dermal route of exposure can result in different patterns of distribution, metabolism, and excretion than occur from the oral route. When toxicity values for systemic effects used on oral exposures are applied to dermal exposures, uncertainty in the risk assessment is introduced because these differences are not taken into account. Since any differences between oral and dermal pathways would depend on the specific constituent, use of modified oral toxicity factors can result in the over- or underestimation of risk, depending on the constituent. It is not possible to make a general statement about the direction or magnitude of this uncertainty (EPA 2004b).

Uncertainty also arises from the presence of constituents for which there are no EPA-approved toxicity values, and for which quantitative risk characterization is not possible. In the absence of EPA-approved toxicity values for aluminum, cobalt, iron, and thallium provisional values have been used in the risk characterization for these COPCs. The toxicity values for these constituents have larger uncertainties than those with approved values. Assumptions made in assigning toxicity values for COPCs for this risk assessment were as follows:

Arsenic in fish fillet samples was evaluated using the CSF and noncancer reference dose for inorganic arsenic, however, analytical data demonstrate that arsenic in fish fillets is largely in the organic form. It is widely accepted that arsenic in fish filets is not bioavailable. For example, Section 2.2 of the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicity Profile for Arsenic (ATSDR 2007) referring to the so-called "fish arsenic" compounds (e.g., arsenobetaine) states "It is generally accepted that the arsenic-carbon bond is quite strong and most mammalian species do not have the capacity to break this bond; thus, inorganic arsenic is not formed during the metabolism of organic arsenicals. In most species, including humans, ingested (or exogenous) MMA(V) and DMA(V) undergo limited metabolism, do not readily enter the cell, and are primarily excreted unchanged in the urine." Therefore, because organic arsenic in unchanged in the body and excreted, it is not available to exert a toxic effect.

- Total chromium was evaluated using the toxicity values for mixtures of Chromium III and Chromium VI. Aluminum, cobalt, iron, and thallium were evaluated with provisional toxicity values from the National Center of Environmental Assessment; without these values, hazards could not be quantified for these metals.
- Alpha- and gamma-chlordane were evaluated using the toxicity values for Chlordane.

In summary, the EPA methodology for both cancer and noncancer toxicity evaluation is intentionally designed to be protective. However, the extent to which toxicity values may overestimate toxic potency is not clear.

1.5.4 Risk Characterization Uncertainty

Risk assessment as a scientific activity is subject to uncertainty. This is true even though the methods used in the BHHRA follow EPA guidelines. As noted previously, the risk assessment in this report is subject to uncertainty pertaining to sampling and analysis, selection of COPCs, exposure estimates, and availability and quality of toxicity data.

The summation of HQs and ILCRs across constituents and pathways is the primary uncertainty in the risk characterization. In the absence of information on the toxicity of specific constituent mixtures, it is assumed that ILCRs and HQs are additive (i.e., cumulative) [EPA 1989]. The limitations of this approach for non-carcinogens are: (1) the effects of a mixture of constituents are generally unknown - it is possible that the interactions could be synergistic, antagonistic, or additive; (2) the RfDs have different accuracy and precision and are not based on the same severity or effect; and (3) HQ or intake summation is most properly applied to constituents that induce the same effects by the same mechanism, (4) the constituent-specific CSFs represent the upper 95^{th} percentile estimate of potency; therefore, summing individual risks can result in an excessively conservative estimate of total lifetime cancer risk; and (5) the target organs of multiple carcinogens may be different, so the risks would not be additive. In the absence of data, additivity for ILCRs and HQs is assumed for this BHHRA.

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APPENDIX A

Figures

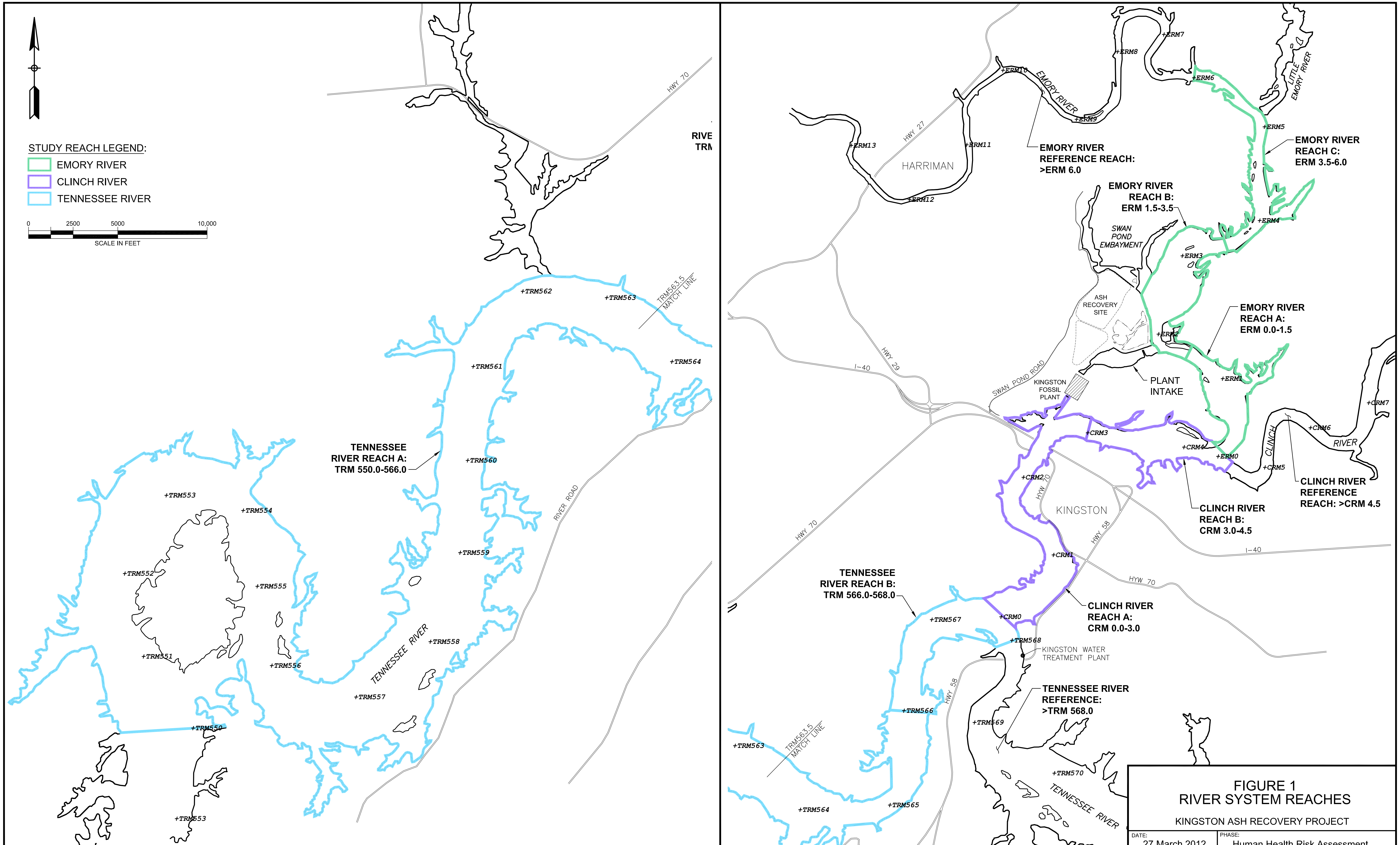
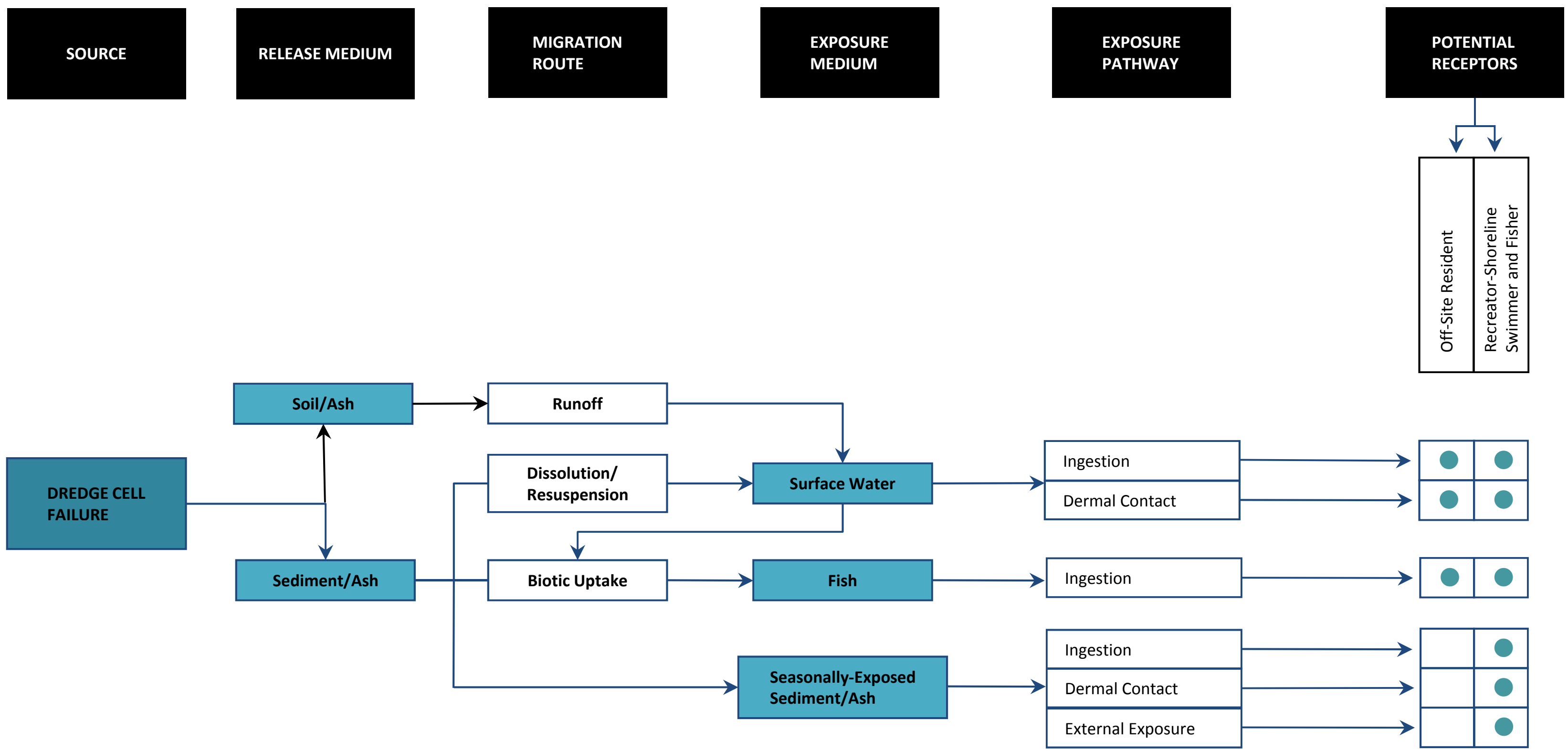


FIGURE 1
RIVER SYSTEM REACHES

KINGSTON ASH RECOVERY PROJECT

Conceptual Site Model for Human Health Risk Assessment
TVA Kingston Fly Ash Recovery Project



Indicates exposure pathway evaluated in the risk assessment.

APPENDIX B

Risk Assessment Tables RAGS Part D Format

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
Kingston Ash Recovery Project

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Water	Surface Water	Emory, Clinch, or Tennessee Rivers	Residents	Child and Adult	Ingestion, Dermal Contact	Quantitative	The residential exposure scenario is appropriate due to current use of surrounding properties.
Current	Surface Water	Surface Water	Emory, Clinch, or Tennessee Rivers	Recreators	Child and Adult	Ingestion, Dermal Contact	Quantitative	The recreational exposure scenario is consistent with the use of these rivers.
Current	Seasonally-Exposed Sediment	Seasonally-Exposed Sediment	Shoreline of the Emory and Clinch Rivers	Recreators	Child and Adult	Ingestion, Dermal Contact, Inhalation, External Exposure to Radionuclides	Quantitative	The recreational exposure scenario is consistent with the use of these rivers.
Current	Fish	Fish fillets	Emory, Little Emory, and Clinch Rivers	Recreators	Child and Adult	Ingestion	Quantitative	Consumption of locally caught fish is known to occur and is consistent with the use of the river system.

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach A		Aluminum	0.0809	0.255	mg/L	ERM1.0	14 / 16	0.05 / 0.122	0.255	NA	NA			Y	a
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 16	0.05 / 0.05	ND	NA	NA			N	b,c
		Antimony	0.00042	0.00042	mg/L	ERM1.0	1 / 16	0.00033 / 0.00033	0.00042	NA	NA			Y	a
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00053	0.00252	mg/L	ERM1.0	16 / 16		0.00252	NA	NA			Y	a
		Arsenic, Dissolved	0.00047	0.00228	mg/L	ERM1.0	16 / 16		0.00228	NA	NA			N	c
		Barium	0.0344	0.0487	mg/L	ERM1.0	16 / 16		0.0487	NA	NA			Y	a
		Barium, Dissolved	0.0332	0.0443	mg/L	ERM1.0	16 / 16		0.0443	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0143	0.0298	mg/L	ERM1.0	16 / 16		0.0298	NA	NA			Y	a
		Boron, Dissolved	0.0131	0.0274	mg/L	ERM1.0	16 / 16		0.0274	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	c
		Calcium	35.4	39.5	mg/L	ERM1.0	16 / 16		39.5	NA	NA			N	d
		Calcium, Dissolved	35	39.6	mg/L	ERM0.3	16 / 16		39.6	NA	NA			N	c,d
		Chromium	0.00037	0.00271	mg/L	ERM1.0	8 / 16	0.00033 / 0.00033	0.00271	NA	NA			Y	a
		Chromium, Dissolved	0.00039	0.00039	mg/L	ERM1.0	1 / 16	0.00033 / 0.00033	0.00039	NA	NA			N	c
		Cobalt	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00058	0.00212	mg/L	ERM1.0	16 / 16		0.00212	NA	NA			Y	a
		Copper, Dissolved	0.00045	0.0014	mg/L	ERM1.0	16 / 16		0.0014	NA	NA			N	c
		Iron	0.0776	0.22	mg/L	ERM1.0	16 / 16		0.22	NA	NA			Y	a
		Iron, Dissolved	ND	ND	mg/L	ND	0 / 16	0.025 / 0.025	ND	NA	NA			N	b,c
		Lead	0.00036	0.00036	mg/L	ERM1.0	1 / 16	0.00033 / 0.00033	0.00036	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	9.84	11.7	mg/L	ERM0.3	16 / 16		11.7	NA	NA			N	d
		Magnesium, Dissolved	9.79	11.7	mg/L	ERM0.3	16 / 16		11.7	NA	NA			N	c,d
		Manganese	0.021	0.0393	mg/L	ERM1.0	16 / 16		0.0393	NA	NA			Y	a
		Manganese, Dissolved	0.00037	0.0137	mg/L	ERM1.0	16 / 16		0.0137	NA	NA			N	c
		Mercury	0.00016	0.00019	mg/L	ERM1.0	2 / 16	0.00015 / 0.00015	0.00019	NA	NA			Y	a
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00015 / 0.00015	ND	NA	NA			N	b,c
		Molybdenum	0.00054	0.0015	mg/L	ERM0.3	14 / 16	0.00033 / 0.00077	0.0015	NA	NA			Y	a
		Molybdenum, Dissolved	0.00049	0.00145	mg/L	ERM0.3	14 / 16	0.00033 / 0.00068	0.00145	NA	NA			N	c
		Nickel	0.00035	0.00072	mg/L	ERM1.0	16 / 16		0.00072	NA	NA			Y	a
		Nickel, Dissolved	0.00033	0.00048	mg/L	ERM0.3	8 / 16	0.00033 / 0.00033	0.00048	NA	NA			N	c

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Potassium	1.49	1.63	mg/L	ERM0.3	16 / 16		1.63	NA	NA			N	d
		Potassium, Dissolved	1.47	1.59	mg/L	ERM1.0	16 / 16		1.59	NA	NA			N	c,d
		Selenium	0.00035	0.00093	mg/L	ERM1.0	7 / 16	0.00033 / 0.00033	0.00093	NA	NA			Y	a
		Selenium, Dissolved	0.00033	0.00066	mg/L	ERM1.0	8 / 16	0.00033 / 0.00033	0.00066	NA	NA			N	c
		Silver	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	6.5	7.09	mg/L	ERM1.0	16 / 16		7.09	NA	NA			N	d
		Sodium, Dissolved	6.29	7.12	mg/L	ERM1.0	16 / 16		7.12	NA	NA			N	c,d
		Strontium	0.109	0.126	mg/L	ERM1.0	16 / 16		0.126	NA	NA			Y	a
		Strontium, Dissolved	0.106	0.124	mg/L	ERM1.0	16 / 16		0.124	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 16	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	0.0011	0.00301	mg/L	ERM1.0	10 / 16	0.001 / 0.001	0.00301	NA	NA			Y	a
		Vanadium, Dissolved	0.0012	0.00252	mg/L	ERM1.0	8 / 16	0.001 / 0.001	0.00252	NA	NA			N	c
		Zinc	0.00993	0.0137	mg/L	ERM1.0	2 / 16	0.0083 / 0.0083	0.0137	NA	NA			Y	a
		Zinc, Dissolved	0.00851	0.00851	mg/L	ERM1.0	1 / 16	0.0083 / 0.0083	0.00851	NA	NA			N	c
		Actinium-228	ND	ND	pCi/L	ND	0 / 4	12.6 / 17.4	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 4	6.06 / 20.9	ND	NA	NA			N	b
		Bismuth-214	34.6	34.6	pCi/L	ERM1.0	1 / 4	7.34 / 10.4	34.6	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 4	3.1 / 4.25	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 4	2.97 / 5.72	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 4	7.05 / 7.68	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 4	8.05 / 23.9	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 4	42.5 / 54.6	ND	NA	NA			N	b
		Radium-226	0.592	0.88	pCi/L	ERM1.0	2 / 4	0.321 / 0.623	0.88	NA	NA			Y	a
		Radium-228	ND	ND	pCi/L	ND	0 / 4	0.327 / 0.986	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 4	3.88 / 5.77	ND	NA	NA			N	e
		Thorium-228	ND	ND	pCi/L	ND	0 / 4	0.0766 / 0.104	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 4	0.0514 / 0.0968	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 4	0.0412 / 0.0933	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 4	75.4 / 194	ND	NA	NA			N	b
		Uranium-234	0.157	0.265	pCi/L	ERM0.3	3 / 4	0.105 / 0.13	0.265	NA	NA			N	b
		Uranium-235	ND	ND	pCi/L	ND	0 / 4	0.0717 / 0.142	ND	NA	NA			N	b
		Uranium-238	0.165	0.171	pCi/L	ERM0.3	3 / 4	0.102 / 0.115	0.171	NA	NA			N	b
		Arsenate, Dissolved	0.00033	0.00053	mg/L	ERM1.0	4 / 4		0.00053	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.0007	0.00143	mg/L	ERM1.0	4 / 4		0.00143	NA	NA			N	f
		Arsenite, Dissolved	0.0001	0.00033	mg/L	ERM1.0	4 / 4		0.00033	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.0003	0.00035	mg/L	ERM1.0	4 / 4		0.00035	NA	NA			N	f
		Inorganic Selenium, Dissolved	0.00048	0.00048	mg/L	ERM1.0	1 / 4	0.00029 / 0.00029	0.00048	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00017	0.00028	mg/L	ERM1.0	4 / 4		0.00028	NA	NA			N	f
		Organic Selenium, Dissolved	0.00041	0.00046	mg/L	ERM0.3	4 / 4		0.00046	NA	NA			N	f

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenate, Dissolved	0.00022	0.00048	mg/L	ERM1.0	2 / 4	0.00016 / 0.00016	0.00048	NA	NA			N	b,f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 4	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	0.00041	0.00046	mg/L	ERM1.0	4 / 4		0.00046	NA	NA			N	f
		Dissolved Organic Carbon	1.5	1.97	mg/L	ERM1.0	16 / 16	1 / 1.74	1.97	NA	NA			N	g
		Hardness (As CaCO3)	129	147	mg/L	ERM0.3	16 / 16		147	NA	NA			N	g
		Total Dissolved Solids	139	181	mg/L	ERM0.3	16 / 16		181	NA	NA			N	g
		Total Suspended Solids	3.1	8.7	mg/L	ERM1.0	14 / 16	6.1 / 7.8	8.7	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach B		Aluminum	0.124	0.319	mg/L	ERM2.0	13 / 16	0.05 / 0.215	0.319	NA	NA			Y	a
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 16	0.05 / 0.05	ND	NA	NA			N	b,c
		Antimony	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00134	0.00278	mg/L	ERM2.0	16 / 16		0.00278	NA	NA			Y	a
		Arsenic, Dissolved	0.00091	0.00232	mg/L	ERM2.0	16 / 16		0.00232	NA	NA			N	c
		Barium	0.0374	0.054	mg/L	ERM2.0	16 / 16		0.054	NA	NA			Y	a
		Barium, Dissolved	0.0362	0.0475	mg/L	ERM3.0	16 / 16		0.0475	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0158	0.027	mg/L	ERM2.0	16 / 16		0.027	NA	NA			Y	a
		Boron, Dissolved	0.0152	0.0257	mg/L	ERM2.0	15 / 16	0.0125 / 0.0125	0.0257	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	34.2	38.8	mg/L	ERM2.0	16 / 16		38.8	NA	NA			N	d
		Calcium, Dissolved	34.1	38.4	mg/L	ERM2.0	16 / 16		38.4	NA	NA			N	c,d
		Chromium	0.00033	0.0005	mg/L	ERM2.0	4 / 16	0.00033 / 0.00033	0.0005	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Cobalt	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00065	0.00173	mg/L	ERM2.0	16 / 16		0.00173	NA	NA			Y	a
		Copper, Dissolved	0.00043	0.00292	mg/L	ERM3.0	16 / 16		0.00292	NA	NA			N	c
		Iron	0.121	0.251	mg/L	ERM2.0	15 / 16	0.025 / 0.025	0.251	NA	NA			Y	a
		Iron, Dissolved	0.0251	0.0304	mg/L	ERM3.0	2 / 16	0.025 / 0.025	0.0304	NA	NA			N	c
		Lead	0.00033	0.00044	mg/L	ERM2.0	8 / 16	0.00033 / 0.00033	0.00044	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	9.73	11.4	mg/L	ERM2.0	16 / 16		11.4	NA	NA			N	d
		Magnesium, Dissolved	9.63	11.1	mg/L	ERM2.0	16 / 16		11.1	NA	NA			N	c,d
		Manganese	0.00825	0.101	mg/L	ERM3.0	16 / 16		0.101	NA	NA			Y	a
		Manganese, Dissolved	0.00051	0.0269	mg/L	ERM3.0	16 / 16		0.0269	NA	NA			N	c
		Mercury	0.00019	0.00019	mg/L	ERM2.0	1 / 16	0.00015 / 0.00015	0.00019	NA	NA			Y	a
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00015 / 0.00015	ND	NA	NA			N	b,c
		Molybdenum	0.00062	0.0013	mg/L	ERM3.0	14 / 16	0.00033 / 0.00112	0.0013	NA	NA			Y	a
		Molybdenum, Dissolved	0.00066	0.00125	mg/L	ERM2.0	14 / 16	0.00033 / 0.00101	0.00125	NA	NA			N	c
		Nickel	0.00044	0.00086	mg/L	ERM2.0	16 / 16		0.00086	NA	NA			Y	a
		Nickel, Dissolved	0.00043	0.00059	mg/L	ERM3.0	2 / 16	0.00033 / 0.00033	0.00059	NA	NA			N	c
		Potassium	1.54	1.67	mg/L	ERM3.0	16 / 16		1.67	NA	NA			N	d
		Potassium, Dissolved	1.49	1.64	mg/L	ERM3.0	16 / 16		1.64	NA	NA			N	c,d

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenium	0.00033	0.00055	mg/L	ERM2.0	7 / 16	0.00033 / 0.00033	0.00055	NA	NA			Y	a
		Selenium, Dissolved	0.00033	0.00058	mg/L	ERM2.0	8 / 16	0.00033 / 0.00033	0.00058	NA	NA			N	c
		Silver	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 16	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	5.99	6.93	mg/L	ERM2.0	16 / 16		6.93	NA	NA			N	d
		Sodium, Dissolved	6.08	7.02	mg/L	ERM2.0	16 / 16		7.02	NA	NA			N	c,d
		Strontium	0.107	0.123	mg/L	ERM2.0	16 / 16		0.123	NA	NA			Y	a
		Strontium, Dissolved	0.107	0.125	mg/L	ERM2.0	16 / 16		0.125	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 16	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 16	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	0.00109	0.00217	mg/L	ERM2.0	15 / 16	0.001 / 0.001	0.00217	NA	NA			Y	a
		Vanadium, Dissolved	0.00102	0.00128	mg/L	ERM2.0	6 / 16	0.001 / 0.001	0.00128	NA	NA			N	c
		Zinc	ND	ND	mg/L	ND	0 / 16	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 16	0.0083 / 0.0083	ND	NA	NA			N	c
		Actinium-228	ND	ND	pCi/L	ND	0 / 4	13.9 / 14.9	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 4	12.3 / 26.6	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 4	7.47 / 8.82	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 4	3.42 / 4.16	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 4	3.17 / 3.82	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 4	6.43 / 11.2	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 4	8.02 / 8.94	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 4	39.6 / 51.1	ND	NA	NA			N	b
		Radium-226	ND	ND	pCi/L	ND	0 / 4	0.498 / 1.64	ND	NA	NA			N	b
		Radium-228	ND	ND	pCi/L	ND	0 / 4	0.707 / 1.72	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 4	3.53 / 5.47	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 4	0.081 / 0.127	ND	NA	NA			N	b
		Thorium-230	0.132	0.132	pCi/L	ERM3.0	1 / 4	0.0443 / 0.102	0.132	NA	NA			Y	a
		Thorium-232	ND	ND	pCi/L	ND	0 / 4	0.0442 / 0.0618	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 4	128 / 266	ND	NA	NA			N	b
		Uranium-234	0.142	0.173	pCi/L	ERM2.0	2 / 4	0.0632 / 0.174	0.173	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/L	ND	0 / 4	0.0672 / 0.147	ND	NA	NA			N	b
		Uranium-238	0.104	0.109	pCi/L	ERM3.0	3 / 4	0.0543 / 0.174	0.109	NA	NA			Y	a
		Arsenate, Dissolved	0.00067	0.00082	mg/L	ERM3.0	4 / 4		0.00082	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00151	0.00172	mg/L	ERM3.0	4 / 4		0.00172	NA	NA			N	f
		Arsenite, Dissolved	0.00034	0.00041	mg/L	ERM3.0	4 / 4		0.00041	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.00101	0.0012	mg/L	ERM3.0	4 / 4		0.0012	NA	NA			N	f
		Inorganic Selenium, Dissolved	0.00054	0.00054	mg/L	ERM2.0	1 / 4	0.00029 / 0.00029	0.00054	NA	NA			N	f
		Organic Arsenic, Dissolved	0.00036	0.00073	mg/L	ERM3.0	4 / 4		0.00073	NA	NA			N	f
		Organic Selenium, Dissolved	0.00039	0.00049	mg/L	ERM3.0	3 / 4	0.00039 / 0.00039	0.00049	NA	NA			N	f
		Selenate, Dissolved	0.00021	0.00054	mg/L	ERM2.0	3 / 4	0.00016 / 0.00016	0.00054	NA	NA			N	f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 4	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	0.00049	0.00102	mg/L	ERM2.0	4 / 4		0.00102	NA	NA			N	f

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dissolved Organic Carbon	1.61	2.24	mg/L	ERM3.0	16 / 16		2.24	NA	NA			N	g
		Hardness (As CaCO3)	126	144	mg/L	ERM2.0	16 / 16		144	NA	NA			N	g
		Total Dissolved Solids	143	177	mg/L	ERM2.0	16 / 16		177	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach C		Aluminum	0.0816	0.339	mg/L	ERM4.0	6 / 8	0.05 / 0.187	0.339	NA	NA			Y	a
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 8	0.05 / 0.05	ND	NA	NA			N	b,c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00109	0.00256	mg/L	ERM4.0	8 / 8		0.00256	NA	NA			Y	a
		Arsenic, Dissolved	0.00098	0.00174	mg/L	ERM4.0	8 / 8		0.00174	NA	NA			N	c
		Barium	0.0395	0.0544	mg/L	ERM4.0	8 / 8		0.0544	NA	NA			Y	a
		Barium, Dissolved	0.0366	0.0474	mg/L	ERM4.0	8 / 8		0.0474	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0166	0.0228	mg/L	ERM4.0	8 / 8		0.0228	NA	NA			Y	a
		Boron, Dissolved	0.017	0.0222	mg/L	ERM4.0	8 / 8		0.0222	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	33	35.6	mg/L	ERM4.0	8 / 8		35.6	NA	NA			N	d
		Calcium, Dissolved	32.6	35.1	mg/L	ERM4.0	8 / 8		35.1	NA	NA			N	c,d
		Chromium	0.00047	0.00047	mg/L	ERM4.0	1 / 8	0.00033 / 0.00033	0.00047	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Cobalt	0.00046	0.00046	mg/L	ERM4.0	1 / 8	0.00033 / 0.00033	0.00046	NA	NA			Y	a
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00055	0.00098	mg/L	ERM4.0	8 / 8		0.00098	NA	NA			Y	a
		Copper, Dissolved	0.00034	0.00212	mg/L	ERM4.0	7 / 8	0.00033 / 0.00033	0.00212	NA	NA			N	c
		Iron	0.0971	0.316	mg/L	ERM4.0	8 / 8		0.316	NA	NA			Y	a
		Iron, Dissolved	ND	ND	mg/L	ND	0 / 8	0.025 / 0.025	ND	NA	NA			N	c
		Lead	0.00058	0.00058	mg/L	ERM4.0	1 / 8	0.00033 / 0.00033	0.00058	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	9.52	10.2	mg/L	ERM4.0	8 / 8		10.2	NA	NA			N	d
		Magnesium, Dissolved	9.39	10	mg/L	ERM4.0	8 / 8		10	NA	NA			N	c,d
		Manganese	0.06	0.225	mg/L	ERM4.0	8 / 8		0.225	NA	NA			Y	a
		Manganese, Dissolved	0.00103	0.15	mg/L	ERM4.0	7 / 8	0.00033 / 0.00169	0.15	NA	NA			N	c
		Mercury	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b,c
		Molybdenum	0.00082	0.00114	mg/L	ERM4.0	7 / 8	0.00033 / 0.00078	0.00114	NA	NA			Y	a
		Molybdenum, Dissolved	0.00083	0.00117	mg/L	ERM4.0	7 / 8	0.00033 / 0.00082	0.00117	NA	NA			N	c
		Nickel	0.0005	0.00083	mg/L	ERM4.0	8 / 8		0.00083	NA	NA			Y	a
		Nickel, Dissolved	0.00036	0.00054	mg/L	ERM4.0	5 / 8	0.00033 / 0.00033	0.00054	NA	NA			N	c
		Potassium	1.54	1.66	mg/L	ERM4.0	8 / 8		1.66	NA	NA			N	d
		Potassium, Dissolved	1.52	1.58	mg/L	ERM4.0	8 / 8		1.58	NA	NA			N	c,d

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Selenium, Dissolved	0.00037	0.0004	mg/L	ERM4.0	2 / 8	0.00033 / 0.00033	0.0004	NA	NA			N	c
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	5.85	6.41	mg/L	ERM4.0	8 / 8		6.41	NA	NA			N	d
		Sodium, Dissolved	5.84	6.41	mg/L	ERM4.0	8 / 8		6.41	NA	NA			N	c,d
		Strontium	0.0964	0.111	mg/L	ERM4.0	8 / 8		0.111	NA	NA			Y	a
		Strontium, Dissolved	0.0975	0.11	mg/L	ERM4.0	8 / 8		0.11	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	0.00111	0.00153	mg/L	ERM4.0	4 / 8	0.001 / 0.001	0.00153	NA	NA			Y	a
		Vanadium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.001 / 0.001	ND	NA	NA			N	c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	c
		Actinium-228	ND	ND	pCi/L	ND	0 / 4	12.9 / 14.2	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	12.9 / 17.1	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	7.72 / 8.59	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	3.14 / 3.36	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	3.1 / 3.59	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	5.81 / 6.56	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	7.42 / 8.35	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	45.4 / 50	ND	NA	NA			N	b
		Radium-226	ND	ND	pCi/L	ND	0 / 2	0.492 / 0.565	ND	NA	NA			N	b
		Radium-228	3.77	3.77	pCi/L	ERM4.0	1 / 2	0.485 / 1	3.77	NA	NA			Y	a
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.29 / 3.93	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.0609 / 0.109	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 2	0.0204 / 0.0743	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.0126 / 0.0463	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	146 / 172	ND	NA	NA			N	b
		Uranium-234	0.251	0.251	pCi/L	ERM4.0	1 / 2	0.101 / 0.137	0.251	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.0779 / 0.133	ND	NA	NA			N	b
		Uranium-238	0.135	0.252	pCi/L	ERM4.0	2 / 2		0.252	NA	NA			Y	a
		Arsenate, Dissolved	0.00068	0.0008	mg/L	ERM4.0	2 / 2		0.0008	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00132	0.00179	mg/L	ERM4.0	2 / 2		0.00179	NA	NA			N	f
		Arsenite, Dissolved	0.00033	0.00033	mg/L	ERM4.0	2 / 2		0.00033	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.00101	0.00113	mg/L	ERM4.0	2 / 2		0.00113	NA	NA			N	f
		Inorganic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00031	0.00066	mg/L	ERM4.0	2 / 2		0.00066	NA	NA			N	f
		Organic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00039 / 0.00039	ND	NA	NA			N	b,f
		Selenate, Dissolved	0.00027	0.00027	mg/L	ERM4.0	1 / 2	0.00016 / 0.00016	0.00027	NA	NA			N	f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	0.00043	0.00043	mg/L	ERM4.0	1 / 2	0.00039 / 0.00039	0.00043	NA	NA			N	f

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dissolved Organic Carbon	1.75	2.61	mg/L	ERM4.0	8 / 8		2.61	NA	NA			N	g
		Hardness (As CaCO3)	122	130	mg/L	ERM4.0	8 / 8		130	NA	NA			N	g
		Total Dissolved Solids	141	167	mg/L	ERM4.0	8 / 8		167	NA	NA			N	g
		Total Suspended Solids	3.9	9.1	mg/L	ERM4.0	7 / 8	1 / 4.7	9.1	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reference Reach		Aluminum	ND	ND	mg/L	ND	0 / 8	0.05 / 0.05	ND	NA	NA			N	b
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 8	0.05 / 0.05	ND	NA	NA			N	b,c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00038	0.0013	mg/L	ERM8.0	8 / 8		0.0013	NA	NA			Y	a
		Arsenic, Dissolved	0.00034	0.00104	mg/L	ERM8.0	8 / 8		0.00104	NA	NA			N	c
		Barium	0.0454	0.0531	mg/L	ERM8.0	8 / 8		0.0531	NA	NA			Y	a
		Barium, Dissolved	0.0423	0.0524	mg/L	ERM8.0	8 / 8		0.0524	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0172	0.0198	mg/L	ERM8.0	8 / 8		0.0198	NA	NA			Y	a
		Boron, Dissolved	0.0171	0.0234	mg/L	ERM8.0	8 / 8		0.0234	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	26.1	35.6	mg/L	ERM8.0	8 / 8		35.6	NA	NA			N	d
		Calcium, Dissolved	25.3	35.5	mg/L	ERM8.0	8 / 8		35.5	NA	NA			N	c,d
		Chromium	0.00041	0.00041	mg/L	ERM8.0	1 / 8	0.00033 / 0.00033	0.00041	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	c
		Cobalt	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00033	0.00067	mg/L	ERM8.0	7 / 8	0.00033 / 0.00033	0.00067	NA	NA			Y	a
		Copper, Dissolved	0.00041	0.00041	mg/L	ERM8.0	1 / 8	0.00033 / 0.00046	0.00041	NA	NA			N	c
		Iron	0.0554	0.133	mg/L	ERM8.0	8 / 8		0.133	NA	NA			Y	a
		Iron, Dissolved	ND	ND	mg/L	ND	0 / 8	0.025 / 0.025	ND	NA	NA			N	b,c
		Lead	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	7.42	10.5	mg/L	ERM8.0	8 / 8		10.5	NA	NA			N	d
		Magnesium, Dissolved	7.18	10.4	mg/L	ERM8.0	8 / 8		10.4	NA	NA			N	c,d
		Manganese	0.0262	0.196	mg/L	ERM8.0	8 / 8		0.196	NA	NA			Y	a
		Manganese, Dissolved	0.00053	0.0373	mg/L	ERM8.0	6 / 8	0.00033 / 0.00214	0.0373	NA	NA			N	c
		Mercury	0.00017	0.00017	mg/L	ERM8.0	1 / 8	0.00015 / 0.00015	0.00017	NA	NA			Y	a
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b,c
		Molybdenum	0.00045	0.00091	mg/L	ERM8.0	8 / 8		0.00091	NA	NA			Y	a
		Molybdenum, Dissolved	0.00053	0.00086	mg/L	ERM8.0	8 / 8		0.00086	NA	NA			N	c
		Nickel	0.0004	0.00072	mg/L	ERM8.0	7 / 8	0.00033 / 0.00033	0.00072	NA	NA			Y	a
		Nickel, Dissolved	0.00037	0.00063	mg/L	ERM8.0	7 / 8	0.00033 / 0.00054	0.00063	NA	NA			N	c
		Potassium	1.52	1.73	mg/L	ERM8.0	8 / 8		1.73	NA	NA			N	d
		Potassium, Dissolved	1.56	1.72	mg/L	ERM8.0	8 / 8		1.72	NA	NA			N	c,d
		Selenium	0.00038	0.00038	mg/L	ERM8.0	1 / 8	0.00033 / 0.00033	0.00038	NA	NA			Y	a
		Selenium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	c

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	5.44	6.21	mg/L	ERM8.0	8 / 8		6.21	NA	NA			N	d
		Sodium, Dissolved	5.35	6.24	mg/L	ERM8.0	8 / 8		6.24	NA	NA			N	c,d
		Strontium	0.0824	0.107	mg/L	ERM8.0	8 / 8		0.107	NA	NA			Y	a
		Strontium, Dissolved	0.0808	0.107	mg/L	ERM8.0	8 / 8		0.107	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	ND	ND	mg/L	ND	0 / 8	0.001 / 0.001	ND	NA	NA			N	b
		Vanadium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.001 / 0.001	ND	NA	NA			N	c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b.c
		Actinium-228	ND	ND	pCi/L	ND	0 / 2	10.9 / 13	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	11.7 / 12.1	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	7.89 / 8.78	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	2.58 / 2.85	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	2.8 / 3.09	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	5.84 / 6.8	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	7.15 / 7.78	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	38.7 / 39.9	ND	NA	NA			N	b
		Radium-226	ND	ND	pCi/L	ND	0 / 2	0.261 / 0.62	ND	NA	NA			N	b
		Radium-228	ND	ND	pCi/L	ND	0 / 2	0.567 / 0.818	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.51 / 3.65	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.0943 / 0.102	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 2	0.0508 / 0.0568	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.0378 / 0.0507	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	127 / 172	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/L	ND	0 / 2	0.081 / 0.128	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.0908 / 0.125	ND	NA	NA			N	b
		Uranium-238	0.147	0.147	pCi/L	ERM8.0	1 / 2	0.0631 / 0.117	0.147	NA	NA			Y	a
		Arsenate, Dissolved	0.00009	0.00016	mg/L	ERM8.0	2 / 2		0.00016	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00062	0.00062	mg/L	ERM8.0	2 / 2		0.00062	NA	NA			N	f
		Arsenite, Dissolved	0.00017	0.00019	mg/L	ERM8.0	2 / 2		0.00019	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.00027	0.00032	mg/L	ERM8.0	2 / 2		0.00032	NA	NA			N	f
		Inorganic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00029	0.00035	mg/L	ERM8.0	2 / 2		0.00035	NA	NA			N	f
		Organic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00039 / 0.00039	ND	NA	NA			N	b,f
		Selenate, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00016 / 0.00016	ND	NA	NA			N	b,f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	ND	ND	mg/L	ND	0 / 2	0.00039 / 0.00039	ND	NA	NA			N	b,f
		Dissolved Organic Carbon	1.78	2.35	mg/L	ERM8.0	8 / 8		2.35	NA	NA			N	g
		Hardness (As CaCO3)	95.7	132	mg/L	ERM8.0	8 / 8		132	NA	NA			N	g
		Total Dissolved Solids	117	156	mg/L	ERM8.0	8 / 8		156	NA	NA			N	g
		Total Suspended Solids	2.5	6.2	mg/L	ERM8.0	7 / 8	1 / 2.4	6.2	NA	NA			N	g

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion

(a) All detected inorganic constituents and radionuclides are retained as COPCs
(b) Only detected inorganic constituents and radionuclides are retained as COPCs
(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.
(d) Essential nutrients were not retained as COPCs.
(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.
(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)
(g Water quality parameters were not retained as COPCs.
NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)
ND = Not Detected

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach A		Aluminum	0.0656	0.214	mg/L	CRM2.0	7 / 8	0.05 / 0.135	0.214	NA	NA			Y	a
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 8	0.05 / 0.05	0	NA	NA			N	b,c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Arsenic	0.00084	0.00153	mg/L	CRM2.0	8 / 8		0.00153	NA	NA			Y	a
		Arsenic, Dissolved	0.00056	0.00136	mg/L	CRM2.0	8 / 8		0.00136	NA	NA			N	c
		Barium	0.0356	0.0442	mg/L	CRM2.0	8 / 8		0.0442	NA	NA			Y	a
		Barium, Dissolved	0.0338	0.0416	mg/L	CRM2.0	8 / 8		0.0416	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Boron	0.0149	0.0267	mg/L	CRM2.0	8 / 8		0.0267	NA	NA			Y	a
		Boron, Dissolved	0.0172	0.0265	mg/L	CRM2.0	8 / 8		0.0265	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Calcium	36.9	39.6	mg/L	CRM2.0	8 / 8		39.6	NA	NA			N	d
		Calcium, Dissolved	36.5	38.9	mg/L	CRM2.0	8 / 8		38.9	NA	NA			N	c,d
		Chromium	0.00036	0.00046	mg/L	CRM2.0	2 / 8	0.00033 / 0.00033	0.00046	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Cobalt	0.00033	0.00033	mg/L	CRM2.0	1 / 8	0.00033 / 0.00033	0.00033	NA	NA			Y	a
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Copper	0.00092	0.00195	mg/L	CRM2.0	8 / 8		0.00195	NA	NA			Y	a
		Copper, Dissolved	0.00068	0.00265	mg/L	CRM2.0	7 / 8	0.00033 / 0.00068	0.00265	NA	NA			N	c
		Iron	0.0678	0.15	mg/L	CRM2.0	8 / 8		0.15	NA	NA			Y	a
		Iron, Dissolved	ND	ND	mg/L	ND	0 / 8	0.025 / 0.025	0	NA	NA			N	b,c
		Lead	0.00037	0.00037	mg/L	CRM2.0	1 / 8	0.00033 / 0.00033	0.00037	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Magnesium	10.7	11.7	mg/L	CRM2.0	8 / 8		11.7	NA	NA			N	d
		Magnesium, Dissolved	10.5	11.4	mg/L	CRM2.0	8 / 8		11.4	NA	NA			N	c,d
		Manganese	0.025	0.0326	mg/L	CRM2.0	8 / 8		0.0326	NA	NA			Y	a
		Manganese, Dissolved	0.00037	0.00893	mg/L	CRM2.0	7 / 8	0.00033 / 0.00256	0.00893	NA	NA			N	c
		Mercury	0.00023	0.00023	mg/L	CRM2.0	1 / 8	0.00015 / 0.00015	0.00023	NA	NA			Y	a
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	0	NA	NA			N	b,c
		Molybdenum	0.00053	0.00104	mg/L	CRM2.0	8 / 8		0.00104	NA	NA			Y	a
		Molybdenum, Dissolved	0.00065	0.00111	mg/L	CRM2.0	8 / 8		0.00111	NA	NA			N	c
		Nickel	0.00035	0.00076	mg/L	CRM2.0	7 / 8	0.00033 / 0.00033	0.00076	NA	NA			Y	a
		Nickel, Dissolved	0.00035	0.00039	mg/L	CRM2.0	3 / 8	0.00033 / 0.00055	0.00039	NA	NA			N	c
		Potassium	1.55	1.61	mg/L	CRM2.0	8 / 8		1.61	NA	NA			N	d
		Potassium, Dissolved	1.46	1.57	mg/L	CRM2.0	8 / 8		1.57	NA	NA			N	c,d

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenium	0.00036	0.00076	mg/L	CRM2.0	4 / 8	0.00033 / 0.00033	0.00076	NA	NA			Y	a
		Selenium, Dissolved	0.00035	0.0007	mg/L	CRM2.0	3 / 8	0.00033 / 0.00033	0.0007	NA	NA			N	c
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	0	NA	NA			N	b,c
		Sodium	6.28	6.97	mg/L	CRM2.0	8 / 8		6.97	NA	NA			N	d
		Sodium, Dissolved	6.28	7.01	mg/L	CRM2.0	8 / 8		7.01	NA	NA			N	c,d
		Strontium	0.108	0.123	mg/L	CRM2.0	8 / 8		0.123	NA	NA			Y	a
		Strontium, Dissolved	0.106	0.123	mg/L	CRM2.0	8 / 8		0.123	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	0	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	0	NA	NA			N	b,c
		Vanadium	0.00102	0.00197	mg/L	CRM2.0	8 / 8		0.00197	NA	NA			Y	a
		Vanadium, Dissolved	0.00106	0.00151	mg/L	CRM2.0	3 / 8	0.001 / 0.001	0.00151	NA	NA			N	c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	0	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	0	NA	NA			N	b.c
		Actinium-228	ND	ND	pCi/L	ND	0 / 2	12.1 / 13.9	0	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	23.7 / 24.4	0	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	8.22 / 11.4	0	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	3.17 / 3.73	0	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	3.34 / 3.47	0	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	6.2 / 8.38	0	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	8.58 / 9.92	0	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	40.6 / 53.8	0	NA	NA			N	b
		Radium-226	ND	ND	pCi/L	ND	0 / 2	0.416 / 0.61	0	NA	NA			N	b
		Radium-228	ND	ND	pCi/L	ND	0 / 2	0.783 / 0.906	0	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.72 / 4.26	0	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.0738 / 0.141	0	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 2	0.0459 / 0.0962	0	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.06 / 0.0732	0	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	207 / 208	0	NA	NA			N	b
		Uranium-234	0.155	0.155	pCi/L	CRM2.0	1 / 2	0.126 / 0.264	0.155	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.0846 / 0.149	0	NA	NA			N	b
		Uranium-238	ND	ND	pCi/L	ND	0 / 2	0.109 / 0.192	0	NA	NA			Y	a
		Arsenate, Dissolved	0.0003	0.00065	mg/L	CRM2.0	2 / 2		0.00065	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00079	0.00146	mg/L	CRM2.0	2 / 2		0.00146	NA	NA			N	f
		Arsenite, Dissolved	0.00011	0.00024	mg/L	CRM2.0	2 / 2		0.00024	NA	NA			N	f
		Hex. Chromium, Dissolved	0.0021	0.0021	mg/L	CRM2.0	1 / 1		0.0021	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.00041	0.00089	mg/L	CRM2.0	2 / 2		0.00089	NA	NA			N	f
		Inorganic Selenium, Dissolved	0.0004	0.0004	mg/L	CRM2.0	1 / 2	0.00029 / 0.00029	0.0004	NA	NA			N	f
		Organic Arsenic, Dissolved	0.00038	0.00056	mg/L	CRM2.0	2 / 2		0.00056	NA	NA			N	f
		Organic Selenium, Dissolved	0.00056	0.00056	mg/L	CRM2.0	2 / 2	0.00039 / 0.00039	0.00056	NA	NA			N	f
		Selenate, Dissolved	0.00017	0.0004	mg/L	CRM2.0	0 / 2		0.0004	NA	NA			N	f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	0	NA	NA			N	b,f

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenium, Dissolved (from speciation lab)	0.00052	0.00096	mg/L	CRM2.0	2 / 2		0.00096	NA	NA			N	f
		Dissolved Organic Carbon	1.59	1.96	mg/L	CRM2.0	7 / 8	1 / 2.03	1.96	NA	NA			N	g
		Hardness (As CaCO3)	136	147	mg/L	CRM2.0	8 / 8		147	NA	NA			N	g
		Total Dissolved Solids	148	190	mg/L	CRM2.0	8 / 8		190	NA	NA			N	g
		Total Suspended Solids	3.9	7.2	mg/L	CRM2.0	8 / 8		7.2	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach B		Aluminum	0.0794	0.139	mg/L	CRM3.5	7 / 8	0.05 / 0.144	0.139	NA	NA			Y	a
		Aluminum, Dissolved	0.142	0.142	mg/L	CRM3.5	1 / 8	0.05 / 0.05	0.142	NA	NA			N	c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00054	0.00195	mg/L	CRM3.5	8 / 8		0.00195	NA	NA			Y	a
		Arsenic, Dissolved	0.00047	0.00158	mg/L	CRM3.5	8 / 8		0.00158	NA	NA			N	c
		Barium	0.0352	0.0415	mg/L	CRM3.5	8 / 8		0.0415	NA	NA			Y	a
		Barium, Dissolved	0.034	0.0386	mg/L	CRM3.5	8 / 8		0.0386	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0142	0.024	mg/L	CRM3.5	8 / 8	0.0125 / 0.0125	0.024	NA	NA			Y	a
		Boron, Dissolved	0.0132	0.0222	mg/L	CRM3.5	7 / 8		0.0222	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	37.3	38.7	mg/L	CRM3.5	8 / 8		38.7	NA	NA			N	d
		Calcium, Dissolved	37	39.5	mg/L	CRM3.5	8 / 8		39.5	NA	NA			N	c,d
		Chromium	0.00039	0.00039	mg/L	CRM3.5	1 / 8	0.00033 / 0.00033	0.00039	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Cobalt	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00077	0.00256	mg/L	CRM3.5	8 / 8		0.00256	NA	NA			Y	a
		Copper, Dissolved	0.00058	0.00237	mg/L	CRM3.5	7 / 8	0.00033 / 0.0014	0.00237	NA	NA			N	c
		Iron	0.0696	0.133	mg/L	CRM3.5	8 / 8		0.133	NA	NA			Y	a
		Iron, Dissolved	0.129	0.129	mg/L	CRM3.5	1 / 8	0.025 / 0.025	0.129	NA	NA			N	b,c
		Lead	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	10.7	11.5	mg/L	CRM3.5	8 / 8		11.5	NA	NA			N	d
		Magnesium, Dissolved	10.6	11.5	mg/L	CRM3.5	8 / 8		11.5	NA	NA			N	c,d
		Manganese	0.0259	0.0391	mg/L	CRM3.5	8 / 8		0.0391	NA	NA			Y	a
		Manganese, Dissolved	0.00047	0.00772	mg/L	CRM3.5	8 / 8		0.00772	NA	NA			N	c
		Mercury	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b,c
		Molybdenum	0.00056	0.00104	mg/L	CRM3.5	8 / 8		0.00104	NA	NA			Y	a
		Molybdenum, Dissolved	0.00048	0.00102	mg/L	CRM3.5	8 / 8		0.00102	NA	NA			N	c
		Nickel	0.00042	0.00059	mg/L	CRM3.5	7 / 8	0.00033 / 0.00033	0.00059	NA	NA			Y	a
		Nickel, Dissolved	0.00034	0.00042	mg/L	CRM3.5	3 / 8	0.00033 / 0.00049	0.00042	NA	NA			N	c
		Potassium	1.52	1.6	mg/L	CRM3.5	8 / 8		1.6	NA	NA			N	d
		Potassium, Dissolved	1.51	1.59	mg/L	CRM3.5	8 / 8		1.59	NA	NA			N	c,d

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenium	0.00034	0.00038	mg/L	CRM3.5	4 / 8	0.00033 / 0.00033	0.00038	NA	NA			Y	a
		Selenium, Dissolved	0.00033	0.00037	mg/L	CRM3.5	3 / 8	0.00033 / 0.00033	0.00037	NA	NA			N	c
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	6.32	6.87	mg/L	CRM3.5	8 / 8		6.87	NA	NA			N	d
		Sodium, Dissolved	6.33	7.03	mg/L	CRM3.5	8 / 8		7.03	NA	NA			N	c,d
		Strontium	0.109	0.116	mg/L	CRM3.5	8 / 8		0.116	NA	NA			Y	a
		Strontium, Dissolved	0.108	0.119	mg/L	CRM3.5	8 / 8		0.119	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	0.00107	0.00221	mg/L	CRM3.5	5 / 8	0.001 / 0.001	0.00221	NA	NA			Y	a
		Vanadium, Dissolved	0.00102	0.002	mg/L	CRM3.5	3 / 8	0.001 / 0.001	0.002	NA	NA			N	c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b.c
		Actinium-228	ND	ND	pCi/L	ND	0 / 2	13.2 / 15.6	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	19.9 / 25.4	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	10.6 / 15.3	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	3.39 / 3.98	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	3.26 / 3.75	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	7.15 / 8.2	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	8.81 / 10	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	40.5 / 49.7	ND	NA	NA			N	b
		Radium-226	0.408	0.499	pCi/L	CRM3.5	2 / 2		0.499	NA	NA			Y	a
		Radium-228	ND	ND	pCi/L	ND	0 / 2	0.848 / 0.871	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.39 / 4.76	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.11 / 0.111	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 2	0.0594 / 0.0802	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.05 / 0.0592	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	179 / 241	ND	NA	NA			N	b
		Uranium-234	0.156	0.156	pCi/L	CRM3.5	1 / 2	0.24	0.156	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.12 / 0.257	ND	NA	NA			N	b
		Uranium-238	0.172	0.172	pCi/L	CRM3.5	1 / 2	0.208	0.172	NA	NA			Y	a
		Arsenate, Dissolved	0.00031	0.00033	mg/L	CRM3.5	2 / 2		0.00033	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00069	0.00084	mg/L	CRM3.5	2 / 2		0.00084	NA	NA			N	f
		Arsenite, Dissolved	0.00009	0.00014	mg/L	CRM3.5	2 / 2		0.00014	NA	NA			N	f
		Hex. Chromium, Dissolved	0.0021	0.0021	mg/L	CRM3.5	1 / 1		0.0021	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.0004	0.00047	mg/L	CRM3.5	2 / 2		0.00047	NA	NA			N	f
		Inorganic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00029	0.00037	mg/L	CRM3.5	2 / 2		0.00037	NA	NA			N	f
		Organic Selenium, Dissolved	0.00049	0.00051	mg/L	CRM3.5	2 / 2		0.00051	NA	NA			N	f
		Selenate, Dissolved	0.00025	0.00025	mg/L	CRM3.5	1 / 2	0.000157	0.00025	NA	NA			N	f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			b,f	f

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Selenium, Dissolved (from speciation lab)	0.00049	0.00075	mg/L	CRM3.5	2 / 2		0.00075	NA	NA			N	f
		Dissolved Organic Carbon	1.48	1.84	mg/L	CRM3.5	6 / 8	1 / 2.15	1.84	NA	NA			N	g
		Hardness (As CaCO3)	138	143	mg/L	CRM3.5	8 / 8		143	NA	NA			N	g
		Total Dissolved Solids	153	183	mg/L	CRM3.5	8 / 8		183	NA	NA			N	g
		Total Suspended Solids	4.8	8	mg/L	CRM3.5	8 / 8		8	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reference Reach		Aluminum	0.0618	0.107	mg/L	CRM6.0	7 / 8	0.05 / 0.1	0.107	NA	NA			Y	a
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 8	0.05 / 0.05	ND	NA	NA			N	b,c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00036	0.00061	mg/L	CRM6.0	8 / 8		0.00061	NA	NA			Y	a
		Arsenic, Dissolved	0.00033	0.00052	mg/L	CRM6.0	6 / 8	0.00033 / 0.00033	0.00052	NA	NA			N	c
		Barium	0.0339	0.0375	mg/L	CRM6.0	8 / 8		0.0375	NA	NA			Y	a
		Barium, Dissolved	0.0327	0.0359	mg/L	CRM6.0	8 / 8		0.0359	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0131	0.0192	mg/L	CRM6.0	8 / 8		0.0192	NA	NA			Y	a
		Boron, Dissolved	0.0137	0.0183	mg/L	CRM6.0	8 / 8		0.0183	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	37.4	39.6	mg/L	CRM6.0	8 / 8		39.6	NA	NA			N	d
		Calcium, Dissolved	36.5	39	mg/L	CRM6.0	8 / 8		39	NA	NA			N	c,d
		Chromium	0.00035	0.00051	mg/L	CRM6.0	2 / 8	0.00033 / 0.00033	0.00051	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Cobalt	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00044	0.00158	mg/L	CRM6.0	8 / 8		0.00158	NA	NA			Y	a
		Copper, Dissolved	0.00033	0.00069	mg/L	CRM6.0	6 / 8	0.00033 / 0.00086	0.00069	NA	NA			N	c
		Iron	0.077	0.126	mg/L	CRM6.0	8 / 8		0.126	NA	NA			Y	a
		Iron, Dissolved	0.0777	0.0777	mg/L	CRM6.0	1 / 8	0.025 / 0.025	0.0777	NA	NA			N	b,c
		Lead	0.00034	0.00034	mg/L	CRM6.0	1 / 8	0.00033 / 0.0004	0.00034	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	10.9	11.7	mg/L	CRM6.0	8 / 8		11.7	NA	NA			N	d
		Magnesium, Dissolved	10.6	11.3	mg/L	CRM6.0	8 / 8		11.3	NA	NA			N	c,d
		Manganese	0.0245	0.0351	mg/L	CRM6.0	8 / 8		0.0351	NA	NA			Y	a
		Manganese, Dissolved	0.00068	0.00625	mg/L	CRM6.0	8 / 8		0.00625	NA	NA			N	c
		Mercury	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b
		Mercury, Dissolved	0.0002	0.0002	mg/L	CRM6.0	1 / 8	0.00015 / 0.00015	0.0002	NA	NA			N	c
		Molybdenum	0.00035	0.00094	mg/L	CRM6.0	8 / 8		0.00094	NA	NA			Y	a
		Molybdenum, Dissolved	0.00046	0.00082	mg/L	CRM6.0	8 / 8		0.00082	NA	NA			N	c
		Nickel	0.00033	0.00065	mg/L	CRM6.0	6 / 8	0.00033 / 0.00033	0.00065	NA	NA			Y	a
		Nickel, Dissolved	0.00034	0.00052	mg/L	CRM6.0	3 / 8	0.00033 / 0.00065	0.00052	NA	NA			N	c
		Potassium	1.52	1.58	mg/L	CRM6.0	8 / 8		1.58	NA	NA			N	d
		Potassium, Dissolved	1.46	1.57	mg/L	CRM6.0	8 / 8		1.57	NA	NA			N	c,d
		Selenium	0.00043	0.00043	mg/L	CRM6.0	1 / 8	0.00033 / 0.00033	0.00043	NA	NA			Y	a
		Selenium, Dissolved	0.00036	0.00036	mg/L	CRM6.0	1 / 8	0.00033 / 0.00033	0.00036	NA	NA			N	c

TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	6.32	6.95	mg/L	CRM6.0	8 / 8		6.95	NA	NA			N	d
		Sodium, Dissolved	6.24	6.96	mg/L	CRM6.0	8 / 8		6.96	NA	NA			N	c,d
		Strontium	0.108	0.116	mg/L	CRM6.0	8 / 8		0.116	NA	NA			Y	a
		Strontium, Dissolved	0.106	0.114	mg/L	CRM6.0	8 / 8		0.114	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	ND	ND	mg/L	ND	0 / 8	0.001 / 0.001	ND	NA	NA			N	b
		Vanadium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.001 / 0.001	ND	NA	NA			N	b,c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b.c
		Actinium-228	ND	ND	pCi/L	ND	0 / 2	14.5 / 16	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	12 / 22.2	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	8.42 / 8.75	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	3.27 / 3.6	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	3.49 / 3.68	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	7.28 / 8.29	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	8.24 / 9.1	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	43.1 / 48.8	ND	NA	NA			N	b
		Radium-226	ND	ND	pCi/L	ND	0 / 2	0.465 / 0.496	ND	NA	NA			N	b
		Radium-228	ND	ND	pCi/L	ND	0 / 2	0.54 / 0.929	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.66 / 4.15	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.0925 / 0.124	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 2	0.0671 / 0.0723	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.0669 / 0.0918	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	120 / 222	ND	NA	NA			N	b
		Uranium-234	0.24	0.268	pCi/L	CRM6.0	2 / 2		0.268	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.153 / 0.256	ND	NA	NA			N	b
		Uranium-238	0.129	0.129	pCi/L	CRM6.0	1 / 2	0.107 / 0.264	0.129	NA	NA			Y	a
		Arsenate, Dissolved	0.00025	0.00029	mg/L	CRM6.0	2 / 2		0.00029	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00051	0.00052	mg/L	CRM6.0	2 / 2		0.00052	NA	NA			N	f
		Arsenite, Dissolved	0.00005	0.00006	mg/L	CRM6.0	2 / 2		0.00006	NA	NA			N	f
		Hex. Chromium, Dissolved	0.0021	0.0021	mg/L	CRM6.0	1 / 1		0.0021	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.0003	0.00035	mg/L	CRM6.0	2 / 2		0.00035	NA	NA			N	f
		Inorganic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00017	0.00028	mg/L	CRM6.0	2 / 2		0.00028	NA	NA			N	f
		Organic Selenium, Dissolved	0.00041	0.00046	mg/L	CRM6.0	2 / 2		0.00046	NA	NA			N	f
		Selenate, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00016 / 0.00016	ND	NA	NA			N	b,f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	0.00041	0.00046	mg/L	CRM6.0	2 / 2		0.00046	NA	NA			N	f
		Dissolved Organic Carbon	1.5	1.79	mg/L	CRM6.0	7 / 8	1 / 1.74	1.79	NA	NA			N	g
		Hardness (As CaCO3)	138	147	mg/L	CRM6.0	8 / 8		147	NA	NA			N	g
		Total Dissolved Solids	155	179	mg/L	CRM6.0	8 / 8		179	NA	NA			N	g

TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Total Suspended Solids	3.4	5.7	mg/L	CRM6.0	8 / 8		5.7	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Tennessee River Reach A		Aluminum	0.0676	0.263	mg/L	TRM566.0	6 / 8	0.05 / 0.122	0.263	NA	NA			Y	a
		Aluminum, Dissolved	0.065	0.065	mg/L	TRM566.0	1 / 8	0.05 / 0.05	0.065	NA	NA			N	c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.0005	0.00131	mg/L	TRM566.0	8 / 8		0.00131	NA	NA			Y	a
		Arsenic, Dissolved	0.00052	0.00098	mg/L	TRM566.0	8 / 8		0.00098	NA	NA			N	c
		Barium	0.0264	0.0396	mg/L	TRM566.0	8 / 8		0.0396	NA	NA			Y	a
		Barium, Dissolved	0.0248	0.0349	mg/L	TRM566.0	8 / 8		0.0349	NA	NA			N	c
		Beryllium	0.00048	0.00048	mg/L	TRM566.0	1 / 8	0.00033 / 0.00033	0.00048	NA	NA			Y	a
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0126	0.0182	mg/L	TRM566.0	8 / 8		0.0182	NA	NA			Y	a
		Boron, Dissolved	0.0137	0.0169	mg/L	TRM566.0	7 / 8	0.0125 / 0.0125	0.0169	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	20.9	35.6	mg/L	TRM566.0	8 / 8		35.6	NA	NA			N	d
		Calcium, Dissolved	20.6	35.2	mg/L	TRM566.0	8 / 8		35.2	NA	NA			N	c,d
		Chromium	0.00043	0.00043	mg/L	TRM566.0	1 / 8	0.00033 / 0.00033	0.00043	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Cobalt	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00056	0.00219	mg/L	TRM566.0	8 / 8		0.00219	NA	NA			Y	a
		Copper, Dissolved	0.00047	0.00318	mg/L	TRM566.0	7 / 8	0.00033 / 0.00041	0.00318	NA	NA			N	c
		Iron	0.0805	0.236	mg/L	TRM566.0	7 / 8	0.025 / 0.025	0.236	NA	NA			Y	a
		Iron, Dissolved	0.0839	0.0839	mg/L	TRM566.0	1/ 8	0.025 / 0.025	0.0839	NA	NA			N	b,c
		Lead	0.00047	0.00047	mg/L	TRM566.0	1 / 8	0.00033 / 0.00033	0.00047	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	5.38	10.5	mg/L	TRM566.0	8 / 8		10.5	NA	NA			N	d
		Magnesium, Dissolved	5.26	10.2	mg/L	TRM566.0	8 / 8		10.2	NA	NA			N	c,d
		Manganese	0.0386	0.0943	mg/L	TRM566.0	7 / 8	0.00033 / 0.00033	0.0943	NA	NA			Y	a
		Manganese, Dissolved	0.00035	0.0387	mg/L	TRM566.0	6 / 8	0.00033 / 0.00058	0.0387	NA	NA			N	c
		Mercury	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b,c
		Molybdenum	0.00041	0.0006	mg/L	TRM566.0	6 / 8	0.00033 / 0.00033	0.0006	NA	NA			Y	a
		Molybdenum, Dissolved	0.00035	0.00072	mg/L	TRM566.0	7 / 8	0.00033 / 0.00033	0.00072	NA	NA			N	c
		Nickel	0.00035	0.00113	mg/L	TRM566.0	4 / 8	0.00033 / 0.00033	0.00113	NA	NA			Y	a
		Nickel, Dissolved	0.0004	0.0004	mg/L	TRM566.0	1 / 8	0.00033 / 0.00051	0.0004	NA	NA			N	c
		Potassium	1.52	1.65	mg/L	TRM566.0	8 / 8		1.65	NA	NA			N	d
		Potassium, Dissolved	1.48	1.62	mg/L	TRM566.0	8 / 8		1.62	NA	NA			N	c,d
		Selenium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Selenium, Dissolved	0.0004	0.0004	mg/L	TRM566.0	1 / 8	0.00033 / 0.00033	0.0004	NA	NA			N	c

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	6.86	7.98	mg/L	TRM566.0	8 / 8		7.98	NA	NA			N	d
		Sodium, Dissolved	6.88	7.98	mg/L	TRM566.0	8 / 8		7.98	NA	NA			N	c,d
		Strontium	0.0738	0.107	mg/L	TRM566.0	8 / 8		0.107	NA	NA			Y	a
		Strontium, Dissolved	0.0748	0.104	mg/L	TRM566.0	8 / 8		0.104	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	0.00102	0.00153	mg/L	TRM566.0	2 / 8	0.001 / 0.001	0.00153	NA	NA			Y	a
		Vanadium, Dissolved	0.001	0.001	mg/L	TRM566.0	1 / 8	0.001 / 0.001	0.001	NA	NA			N	c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b.c
		Actinium-228	ND	ND	pCi/L	ND	0 / 2	12.7 / 12.9	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	16 / 24.3	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	7.66 / 8.43	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	3.77 / 4.03	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	3.17 / 3.2	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	6.57 / 7.11	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	7.99 / 11.3	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	36 / 48.1	ND	NA	NA			N	b
		Radium-226	0.609	0.609	pCi/L	TRM566.0	1 / 2	0.393 / 0.393	0.609	NA	NA			Y	a
		Radium-228	ND	ND	pCi/L	ND	0 / 2	0.54 / 0.98	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.33 / 3.89	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.104 / 0.11	ND	NA	NA			N	b
		Thorium-230	0.235	0.235	pCi/L	TRM566.0	1 / 2	0.0652 / 0.0652	0.235	NA	NA			Y	a
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.0407 / 0.125	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	156 / 203	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/L	ND	0 / 2	0.108 / 0.232	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.0723 / 0.18	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/L	ND	0 / 2	0.108 / 0.145	ND	NA	NA			N	b
		Arsenate, Dissolved	0.0003	0.0004	mg/L	TRM566.0	2 / 2		0.0004	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00062	0.00064	mg/L	TRM566.0	2 / 2		0.00064	NA	NA			N	f
		Arsenite, Dissolved	0.00005	0.00009	mg/L	TRM566.0	2 / 2		0.00009	NA	NA			N	f
		Hex. Chromium, Dissolved	0.0016	0.0016	mg/L	TRM566.0	1 / 1		0.0016	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.00035	0.00048	mg/L	TRM566.0	2 / 2		0.00048	NA	NA			N	f
		Inorganic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00016	0.00027	mg/L	TRM566.0	2 / 2		0.00027	NA	NA			N	f
		Organic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00039 / 0.00039	ND	NA	NA			N	b,f
		Selenate, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00016 / 0.00016	ND	NA	NA			N	b,f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	ND	ND	mg/L	ND	0 / 2	0.00039 / 0.00039	ND	NA	NA			N	b,f
		Dissolved Organic Carbon	1.84	2.16	mg/L	TRM566.0	7 / 8	1 / 1.87	2.16	NA	NA			N	g
		Hardness (As CaCO3)	74.5	132	mg/L	TRM566.0	8 / 8		132	NA	NA			N	g
		Total Dissolved Solids	84	155	mg/L	TRM566.0	8 / 8		155	NA	NA			N	g

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Total Suspended Solids	4.4	14	mg/L	TRM566.0	8 / 8		14	NA	NA			N	g

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentratio n (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Tennessee River Reference Reach		Aluminum	0.0618	0.107	mg/L	TRM568.5	8 / 8	0.05 / 0.1	0.107	NA	NA			Y	a
		Aluminum, Dissolved	ND	ND	mg/L	ND	0 / 8	0.05 / 0.05	ND	NA	NA			N	b,c
		Antimony	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Antimony, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Arsenic	0.00036	0.00061	mg/L	TRM568.5	8 / 8		0.00061	NA	NA			Y	a
		Arsenic, Dissolved	0.00033	0.00052	mg/L	TRM568.5	8 / 8	0.00033 / 0.00033	0.00052	NA	NA			N	c
		Barium	0.0339	0.0375	mg/L	TRM568.5	8 / 8		0.0375	NA	NA			Y	a
		Barium, Dissolved	0.0327	0.0359	mg/L	TRM568.5	8 / 8		0.0359	NA	NA			N	c
		Beryllium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Beryllium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Boron	0.0131	0.0192	mg/L	TRM568.5	5 / 8		0.0192	NA	NA			Y	a
		Boron, Dissolved	0.0137	0.0183	mg/L	TRM568.5	6 / 8		0.0183	NA	NA			N	c
		Cadmium	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cadmium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Calcium	37.4	39.6	mg/L	TRM568.5	8 / 8		39.6	NA	NA			N	d
		Calcium, Dissolved	36.5	39	mg/L	TRM568.5	8 / 8		39	NA	NA			N	c,d
		Chromium	0.00035	0.00051	mg/L	TRM568.5	1 / 8	0.00033 / 0.00033	0.00051	NA	NA			Y	a
		Chromium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Cobalt	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b
		Cobalt, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Copper	0.00044	0.00158	mg/L	TRM568.5	8 / 8		0.00158	NA	NA			Y	a
		Copper, Dissolved	0.00033	0.00069	mg/L	TRM568.5	7 / 8	0.00033 / 0.00086	0.00069	NA	NA			N	c
		Iron	0.077	0.126	mg/L	TRM568.5	7 / 8		0.126	NA	NA			Y	a
		Iron, Dissolved	0.0777	0.0777	mg/L	TRM568.5	0 / 8	0.025 / 0.025	0.0777	NA	NA			N	c
		Lead	0.00034	0.00034	mg/L	TRM568.5	0 / 8	0.00033 / 0.0004	0.00034	NA	NA			Y	a
		Lead, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Magnesium	10.9	11.7	mg/L	TRM568.5	8 / 8		11.7	NA	NA			N	d
		Magnesium, Dissolved	10.6	11.3	mg/L	TRM568.5	8 / 8		11.3	NA	NA			N	c,d
		Manganese	0.0245	0.0351	mg/L	TRM568.5	8 / 8		0.0351	NA	NA			Y	a
		Manganese, Dissolved	0.00068	0.00625	mg/L	TRM568.5	7 / 8		0.00625	NA	NA			N	c
		Mercury	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	ND	NA	NA			N	b
		Mercury, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00015 / 0.00015	0.0002	NA	NA			N	b,c
		Molybdenum	0.00035	0.00094	mg/L	TRM568.5	5 / 8		0.00094	NA	NA			Y	a
		Molybdenum, Dissolved	0.00046	0.00082	mg/L	TRM568.5	5 / 8		0.00082	NA	NA			N	c
		Nickel	0.00033	0.00065	mg/L	TRM568.5	5 / 8	0.00033 / 0.00033	0.00065	NA	NA			Y	a
		Nickel, Dissolved	0.00034	0.00052	mg/L	TRM568.5	1 / 8	0.00033 / 0.00065	0.00052	NA	NA			N	c
		Potassium	1.52	1.58	mg/L	TRM568.5	8 / 8		1.58	NA	NA			N	d
		Potassium, Dissolved	1.46	1.57	mg/L	TRM568.5	8 / 8		1.57	NA	NA			N	c,d
		Selenium	0.00043	0.00043	mg/L	TRM568.5	2 / 8	0.00033 / 0.00033	0.00043	NA	NA			Y	a
		Selenium, Dissolved	0.00036	0.00036	mg/L	TRM568.5	1 / 8	0.00033 / 0.00033	0.00036	NA	NA			N	c
		Silver	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Silver, Dissolved	ND	ND	mg/L	ND	0 / 8	0.00033 / 0.00033	ND	NA	NA			N	b,c
		Sodium	6.32	6.95	mg/L	TRM568.5	8 / 8		6.95	NA	NA			N	d
		Sodium, Dissolved	6.24	6.96	mg/L	TRM568.5	8 / 8		6.96	NA	NA			N	c,d
		Strontium	0.108	0.116	mg/L	TRM568.5	8 / 8		0.116	NA	NA			Y	a
		Strontium, Dissolved	0.106	0.114	mg/L	TRM568.5	8 / 8		0.114	NA	NA			N	c
		Thallium	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b
		Thallium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0005 / 0.0005	ND	NA	NA			N	b,c
		Vanadium	ND	ND	mg/L	ND	2 / 8	0.001 / 0.001	ND	NA	NA			N	b
		Vanadium, Dissolved	ND	ND	mg/L	ND	0 / 8	0.001 / 0.001	ND	NA	NA			N	b,c
		Zinc	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b
		Zinc, Dissolved	ND	ND	mg/L	ND	0 / 8	0.0083 / 0.0083	ND	NA	NA			N	b.c
		Actinium-228	ND	ND	pCi/L	ND	0 / 2	14.5 / 16	ND	NA	NA			N	b,e
		Americium-241	ND	ND	pCi/L	ND	0 / 2	12 / 22.2	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/L	ND	0 / 2	8.42 / 8.75	ND	NA	NA			N	b,e
		Cesium-137	ND	ND	pCi/L	ND	0 / 2	3.27 / 3.6	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/L	ND	0 / 2	3.49 / 3.68	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/L	ND	0 / 2	7.28 / 8.29	ND	NA	NA			N	b,e
		Lead-214	ND	ND	pCi/L	ND	0 / 2	8.24 / 9.1	ND	NA	NA			N	b,e
		Potassium-40	ND	ND	pCi/L	ND	0 / 2	43.1 / 48.8	ND	NA	NA			N	b
		Radium-226	ND	ND	pCi/L	ND	0 / 2	0.465 / 0.496	ND	NA	NA			N	b
		Radium-228	ND	ND	pCi/L	ND	0 / 2	0.54 / 0.929	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/L	ND	0 / 2	3.66 / 4.15	ND	NA	NA			N	b,e
		Thorium-228	ND	ND	pCi/L	ND	0 / 2	0.0925 / 0.124	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/L	ND	0 / 2	0.0671 / 0.0723	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/L	ND	0 / 2	0.0669 / 0.0918	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/L	ND	0 / 2	120 / 222	ND	NA	NA			N	b
		Uranium-234	0.24	0.268	pCi/L	TRM568.5	1 / 2		0.268	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/L	ND	0 / 2	0.153 / 0.256	ND	NA	NA			N	b
		Uranium-238	0.129	0.129	pCi/L	TRM568.5	0 / 2	0.107 / 0.264	0.129	NA	NA			Y	a
		Arsenate, Dissolved	0.00025	0.00029	mg/L	TRM568.5	2 / 2		0.00029	NA	NA			N	f
		Arsenic, Dissolved (from speciation lab)	0.00051	0.00052	mg/L	TRM568.5	2 / 2		0.00052	NA	NA			N	f
		Arsenite, Dissolved	0.00005	0.00006	mg/L	TRM568.5	2 / 2		0.00006	NA	NA			N	f
		Hex. Chromium, Dissolved	0.002	0.002	mg/L	TRM568.5	1 / 1		0.002	NA	NA			N	f
		Inorganic Arsenic, Dissolved	0.0003	0.00035	mg/L	TRM568.5	2 / 2		0.00035	NA	NA			N	f
		Inorganic Selenium, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Organic Arsenic, Dissolved	0.00017	0.00028	mg/L	TRM568.5	2 / 2		0.00028	NA	NA			N	f
		Organic Selenium, Dissolved	0.00041	0.00046	mg/L	TRM568.5	0 / 2		0.00046	NA	NA			N	f
		Selenate, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00016 / 0.00016	ND	NA	NA			N	b,f
		Selenite, Dissolved	ND	ND	mg/L	ND	0 / 2	0.00029 / 0.00029	ND	NA	NA			N	b,f
		Selenium, Dissolved (from speciation lab)	0.00041	0.00046	mg/L	TRM568.5	0 / 2		0.00046	NA	NA			N	g
		Dissolved Organic Carbon	1.5	1.79	mg/L	TRM568.5	7 / 8	1 / 1.74	1.79	NA	NA			N	g
		Hardness (As CaCO3)	138	147	mg/L	TRM568.5	8 / 8		147	NA	NA			N	g
		Total Dissolved Solids	155	179	mg/L	TRM568.5	8 / 8		179	NA	NA			N	g
		Total Suspended Solids	3.4	5.7	mg/L	TRM568.5	8 / 8		5.7	NA	NA			N	g

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion

(a) All detected inorganic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic constituents and radionuclides are retained as COPCs

(c) Results for dissolved constituents were eliminated as COPCs. Risks estimates were based on total analyte concentrations.

(d) Essential nutrients were not retained as COPCs.

(e) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(f) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

(g Water quality parameters were not retained as COPCs.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentratio n (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach A		Aluminum	13800	76500	mg/kg		12/12		76500	NA	NA			Y	a
		Antimony	1.27	1.8	mg/kg		4/12	1.18/1.96	1.8	NA	NA			Y	a
		Arsenic	5.02	32.3	mg/kg		12/12		32.3	NA	NA			Y	a
		Barium	84.5	245	mg/kg		12/12		245	NA	NA			Y	a
		Beryllium	0.59	2.19	mg/kg		11/12	0.495/0.495	2.19	NA	NA			Y	a
		Boron	6.01	88	mg/kg		12/12		88	NA	NA			Y	a
		Cadmium	ND	ND	mg/kg		0/12	0.118/0.196	ND	NA	NA			N	b
		Calcium	521	3630	mg/kg		12/12		3630	NA	NA			N	c
		Chromium	15.2	86	mg/kg		12/12		86	NA	NA			Y	a
		Cobalt	7.74	46.6	mg/kg		12/12		46.6	NA	NA			Y	a
		Copper	6.08	31.7	mg/kg		12/12		31.7	NA	NA			Y	a
		Hex. Chromium	0.58	1.2	mg/kg		2/3	0.33/0.33	1.2	NA	NA			Y	a
		Iron	13300	48200	mg/kg		12/12		48200	NA	NA			Y	a
		Lead	12.5	126	mg/kg		12/12		126	NA	NA			Y	a
		Magnesium	1010	9000	mg/kg		12/12		9000	NA	NA			Y	a
		Manganese	289	2910	mg/kg		12/12		2910	NA	NA			Y	a
		Mercury	0.058	0.13	mg/kg		6/12	0.05/0.066	0.13	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0/12	4.72/7.83	ND	NA	NA			N	b
		Nickel	7.42	40.6	mg/kg		12/12		40.6	NA	NA			Y	a
		Potassium	1240	24700	mg/kg		12/12		24700	NA	NA			N	c
		Selenium	1.89	3.05	mg/kg		3/12	1.23/1.57	3.05	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0/12	0.59/0.978	ND	NA	NA			N	b
		Sodium	190	257	mg/kg		3/12	118/157	257	NA	NA			N	c
		Strontium	9.94	149	mg/kg		12/12		149	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0/12	1.18/1.96	ND	NA	NA			N	b
		Vanadium	24.2	80.1	mg/kg		12/12		80.1	NA	NA			Y	a
		Zinc	27.3	132	mg/kg		12/12		132	NA	NA			Y	a
		Acenaphthene	ND	ND	mg/kg		0/3	0.00067/0.00078	ND	NA	NA			N	b
		Acenaphthylene	ND	ND	mg/kg		0/3	0.00067/0.00078	ND	NA	NA			N	b
		Anthracene	0.001	0.001	mg/kg		1/3	0.00067/0.00078	0.001	NA	NA			Y	a
		Benzo(a)anthracene	0.0066	0.0077	mg/kg		2/3	0.00067/0.00067	0.0077	NA	NA			Y	a
		Benzo(a)pyrene	0.0051	0.0079	mg/kg		2/3	0.00067/0.00067	0.0079	NA	NA			Y	a
		Benzo(b)fluoranthene	0.0086	0.027	mg/kg		2/3	0.00067/0.00067	0.027	NA	NA			Y	a
		Benzo(g,h,i)perylene	0.0021	0.0022	mg/kg		2/3	0.00067/0.00067	0.0022	NA	NA			Y	a
		Benzo(k)fluoranthene	0.0057	0.018	mg/kg		2/3	0.00067/0.00067	0.018	NA	NA			Y	a
		Chrysene	0.0061	0.013	mg/kg		2/3	0.00067/0.00067	0.013	NA	NA			Y	a
		Dibenz(a,h)anthracene	0.00094	0.0012	mg/kg		2/3	0.00067/0.00067	0.0012	NA	NA			Y	a
		Fluoranthene	0.01	0.012	mg/kg		2/3	0.00067/0.00067	0.012	NA	NA			Y	a
		Fluorene	ND	ND	mg/kg		0/3	0.00067/0.00078	ND	NA	NA			N	b

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentratio n (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Indeno(1,2,3-cd)pyrene	0.0024	0.0029	mg/kg		2/3	0.00067/0.00067	0.0029	NA	NA			Y	a
		Naphthalene	0.00077	0.00077	mg/kg		1/3	0.00067/0.00078	0.00077	NA	NA			Y	a
		Phenanthrene	0.0014	0.0021	mg/kg		2/3	0.00067/0.00067	0.0021	NA	NA			Y	a
		Pyrene	0.011	0.017	mg/kg		2/3	0.00067/0.00067	0.017	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1254	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1260	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1262	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		PCB-1268	ND	ND	mg/kg		0/3	0.0017/0.0019	ND	NA	NA			N	b
		4,4'-DDD	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		4,4'-DDE	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		4,4'-DDT	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		alpha-Chlordane	0.023	0.023	mg/kg		1/3	0.00033/0.00039	0.023	NA	NA			Y	a
		beta-BHC	0.00062	0.00062	mg/kg		1/3	0.00033/0.004	0.00062	NA	NA			Y	a
		delta-BHC	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0/3	0.00065/0.0077	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		gamma-Chlordane	0.036	0.036	mg/kg		1/3	0.00033/0.00039	0.036	NA	NA			Y	a
		Heptachlor	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0/3	0.00033/0.004	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0/3	0.0033/0.04	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0/3	0.033/0.4	ND	NA	NA			N	b
		Actinium-228	1.23	1.68	pCi/g		3/3		1.68	NA	NA			N	d
		Americium-241	ND	ND	pCi/g		0/3	72/203	ND	NA	NA			N	b
		Bismuth-214	0.969	1.08	pCi/g		3/3		1.08	NA	NA			N	d
		Cesium-137	0.406	0.406	pCi/g		1/3	0.0545/0.0728	0.406	NA	NA			Y	a
		Cobalt-60	ND	ND	pCi/g		0/3	0.0526/0.0589	ND	NA	NA			N	b
		Lead-212	1.44	1.91	pCi/g		3/3		1.91	NA	NA			N	d
		Lead-214	1.28	1.42	pCi/g		3/3		1.42	NA	NA			N	d
		Potassium-40	14.9	23.3	pCi/g		3/3		23.3	NA	NA			Y	a
		Radium-226	0.969	1.08	pCi/g		3/3		1.08	NA	NA			Y	a

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Radium-228	1.23	1.68	pCi/g		3/3		1.68	NA	NA			Y	a
		Thallium-208	0.32	0.566	pCi/g		3/3		0.566	NA	NA			N	d
		Thorium-228	1.23	1.8	pCi/g		3/3		1.8	NA	NA			Y	a
		Thorium-230	1.03	1.55	pCi/g		3/3		1.55	NA	NA			Y	a
		Thorium-232	0.95	1.61	pCi/g		3/3		1.61	NA	NA			Y	a
		Thorium-234	0.981	0.981	pCi/g		1/3	1.42/1.88	0.981	NA	NA			Y	a
		Uranium-234	0.822	1.31	pCi/g		3/3		1.31	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/g		0/3	0.0797/0.167	ND	NA	NA			Y	a
		Uranium-238	0.999	1.26	pCi/g		3/3		1.26	NA	NA			Y	a
		Arsenate-speciation	14	14.8	mg/kg		3/3		14.8	NA	NA			N	e
		Arsenic-speciation	11	24.6	mg/kg		3/3		24.6	NA	NA			N	e
		Arsenite-speciation	0.245	9.05	mg/kg		3/3		9.05	NA	NA			N	e
		Inorganic Arsenic-speciation	14.3	23.9	mg/kg		3/3		23.9	NA	NA			N	e
		Inorganic Mercury-speciation	0.0194	0.0573	mg/kg		3/3		0.0573	NA	NA			N	e
		Inorganic Selenium-speciation	0.485	0.485	mg/kg		1/3	0.327/0.512	0.485	NA	NA			N	e
		Mercury-speciation	0.0194	0.0574	mg/kg		3/3		0.0574	NA	NA			N	e
		Methyl mercury-speciation	0.000012	0.000491	mg/kg		3/3		0.000491	NA	NA			N	e
		Organic Arsenic-speciation	2.01	2.01	mg/kg		1/3	1.5/3.51	2.01	NA	NA			N	e
		Organic Selenium-speciation	1.04	1.28	mg/kg		2/3	0.641/0.641	1.28	NA	NA			N	e
		Selenate-speciation	ND	ND	mg/kg		0/3	0.259/0.405	ND	NA	NA			N	b,e
		Selenite-speciation	0.485	0.485	mg/kg		1/3	0.327/0.512	0.485	NA	NA			N	e
		Selenium-speciation	0.819	1.28	mg/kg		3/3		1.28	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach B		Aluminum	3320	39400	mg/kg		18/18		39400	NA	NA			Y	a
		Antimony	1.39	2.26	mg/kg		2/18	1.22/1.85	2.26	NA	NA			Y	a
		Arsenic	3.15	62.4	mg/kg		17/18	1.36/1.36	62.4	NA	NA			Y	a
		Barium	20.4	478	mg/kg		18/18		478	NA	NA			Y	a
		Beryllium	0.656	3.52	mg/kg		15/18	0.514/0.563	3.52	NA	NA			Y	a
		Boron	5.31	51.8	mg/kg		12/18	4.98/7.39	51.8	NA	NA			Y	a
		Cadmium	ND	ND	mg/kg		0/18	0.118/0.185	ND	NA	NA			N	b
		Calcium	232	58700	mg/kg		18/18		58700	NA	NA			N	c
		Chromium	5.27	42.4	mg/kg		18/18		42.4	NA	NA			Y	a
		Cobalt	2.59	38.1	mg/kg		18/18		38.1	NA	NA			Y	a
		Copper	1.64	47.1	mg/kg		18/18		47.1	NA	NA			Y	a
		Hex. Chromium	0.35	0.45	mg/kg		2/5	0.55/0.74	0.45	NA	NA			Y	a
		Iron	3420	40000	mg/kg		18/18		40000	NA	NA			Y	a
		Lead	3.06	79.5	mg/kg		18/18		79.5	NA	NA			Y	a
		Magnesium	245	7070	mg/kg		18/18		7070	NA	NA			Y	a
		Manganese	43.6	4120	mg/kg		18/18		4120	NA	NA			Y	a
		Mercury	0.053	0.12	mg/kg		7/18	0.048/0.073	0.12	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0/18	4.71/7.39	ND	NA	NA			N	b
		Nickel	4.2	54.7	mg/kg		18/18		54.7	NA	NA			Y	a
		Potassium	301	11700	mg/kg		18/18		11700	NA	NA			N	c
		Selenium	1.36	3.64	mg/kg		3/18	1.18/1.85	3.64	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0/18	0.589/0.924	ND	NA	NA			N	b
		Sodium	498	498	mg/kg		1/18	118/185	498	NA	NA			N	c
		Strontium	5.66	321	mg/kg		17/18	5.46/5.46	321	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0/18	1.18/1.85	ND	NA	NA			N	b
		Vanadium	5.08	78.6	mg/kg		18/18		78.6	NA	NA			Y	a
		Zinc	15.8	113	mg/kg		18/18		113	NA	NA			Y	a
		Acenaphthene	0.0019	0.0019	mg/kg		1/4	0.00065/0.0029	0.0019	NA	NA			Y	a
		Acenaphthylene	ND	ND	mg/kg		0/4	0.00065/0.0029	ND	NA	NA			N	b
		Anthracene	0.0043	0.021	mg/kg		2/4	0.00065/0.00066	0.021	NA	NA			Y	a
		Benzo(a)anthracene	0.002	0.055	mg/kg		4/4		0.055	NA	NA			Y	a
		Benzo(a)pyrene	0.0018	0.061	mg/kg		4/4		0.061	NA	NA			Y	a
		Benzo(b)fluoranthene	0.0031	0.09	mg/kg		4/4		0.09	NA	NA			Y	a
		Benzo(g,h,i)perylene	0.0011	0.026	mg/kg		4/4		0.026	NA	NA			Y	a
		Benzo(k)fluoranthene	0.002	0.065	mg/kg		4/4		0.065	NA	NA			Y	a
		Chrysene	0.0022	0.08	mg/kg		4/4		0.08	NA	NA			Y	a
		Dibenz(a,h)anthracene	0.00073	0.01	mg/kg		3/4	0.00065/0.00065	0.01	NA	NA			Y	a
		Fluoranthene	0.0037	0.074	mg/kg		4/4		0.074	NA	NA			Y	a

TABLE 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Fluorene	0.00075	0.0041	mg/kg		3/4	0.00065/0.00065	0.0041	NA	NA			Y	a
		Indeno(1,2,3-cd)pyrene	0.0011	0.028	mg/kg		4/4		0.028	NA	NA			Y	a
		Naphthalene	0.0008	0.006	mg/kg		5/5		0.006	NA	NA			Y	a
		Phenanthrene	0.0012	0.026	mg/kg		5/5		0.026	NA	NA			Y	a
		Pyrene	0.0037	0.071	mg/kg		4/4		0.071	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		PCB-1254	0.0032	0.0032	mg/kg		1/5	0.0016/0.0024	0.0032	NA	NA			Y	a
		PCB-1260	0.0032	0.0052	mg/kg		2/5	0.0016/0.0019	0.0052	NA	NA			Y	a
		PCB-1262	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		PCB-1268	ND	ND	mg/kg		0/5	0.0016/0.0024	ND	NA	NA			N	b
		4,4'-DDD	ND	ND	mg/kg		0/5	0.00064/0.00092	ND	NA	NA			N	b
		4,4'-DDE	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		4,4'-DDT	0.0033	0.0033	mg/kg		1/5	0.00064/0.00092	0.0033	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		beta-BHC	0.001	0.001	mg/kg		1/5	0.00033/0.00048	0.001	NA	NA			Y	a
		delta-BHC	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0/5	0.00064/0.00093	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		Heptachlor	0.00055	0.00055	mg/kg		1/5	0.00033/0.00048	0.00055	NA	NA			Y	a
		Heptachlor Epoxide	ND	ND	mg/kg		0/5	0.00033/0.00048	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0/5	0.0033/0.0048	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0/5	0.033/0.048	ND	NA	NA			N	b
		Actinium-228	0.705	2.82	pCi/g		5/5		2.82	NA	NA			N	d
		Americium-241	ND	ND	pCi/g		0/5	97.6/264	ND	NA	NA			N	b
		Bismuth-214	0.681	3.68	pCi/g		5/5		3.68	NA	NA			N	d
		Cesium-137	0.0462	0.328	pCi/g		3/5	0.0649/0.0737	0.328	NA	NA			Y	a
		Cobalt-60	ND	ND	pCi/g		0/5	0.0252/0.0734	ND	NA	NA			N	b
		Lead-212	0.737	3.07	pCi/g		5/5		3.07	NA	NA			N	d
		Lead-214	0.738	4.1	pCi/g		5/5		4.1	NA	NA			N	d

TABLE 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Potassium-40	5.17	42.8	pCi/g		5/5		42.8	NA	NA			Y	a
		Radium-226	0.681	3.68	pCi/g		5/5		3.68	NA	NA			Y	a
		Radium-228	0.705	2.82	pCi/g		5/5		2.82	NA	NA			Y	a
		Thallium-208	0.175	0.938	pCi/g		5/5		0.938	NA	NA			N	d
		Thorium-228	0.47	2.64	pCi/g		5/5		2.64	NA	NA			Y	a
		Thorium-230	0.555	4.11	pCi/g		5/5		4.11	NA	NA			Y	a
		Thorium-232	0.61	3.03	pCi/g		5/5		3.03	NA	NA			Y	a
		Thorium-234	4.37	4.37	pCi/g		1/5	0.821/1.65	4.37	NA	NA			Y	a
		Uranium-234	0.715	2.94	pCi/g		5/5		2.94	NA	NA			Y	a
		Uranium-235	0.0473	0.13	pCi/g		4/5	0.105/0.105	0.13	NA	NA			Y	a
		Uranium-238	0.7	3.53	pCi/g		5/5		3.53	NA	NA			Y	a
		Arsenate-speciation	2	54.8	mg/kg		5/5		54.8	NA	NA			N	e
		Arsenic-speciation	3.15	59.8	mg/kg		5/5		59.8	NA	NA			N	e
		Arsenite-speciation	0.208	11.3	mg/kg		5/5		11.3	NA	NA			N	e
		Inorganic Arsenic-speciation	3.65	63.9	mg/kg		5/5		63.9	NA	NA			N	e
		Inorganic Mercury-speciation	0.0088	0.0978	mg/kg		5/5		0.0978	NA	NA			N	e
		Inorganic Selenium-speciation	1.58	1.58	mg/kg		1/5	0.343/0.529	1.58	NA	NA			N	e
		Mercury-speciation	0.00884	0.0983	mg/kg		5/5		0.0983	NA	NA			N	e
		Methyl mercury-speciation	0.000042	0.0011	mg/kg		5/5		0.0011	NA	NA			N	e
		Organic Arsenic-speciation	1.52	1.52	mg/kg		1/5	0.599/10.7	1.52	NA	NA			N	e
		Organic Selenium-speciation	0.821	2.32	mg/kg		3/4	0.659/0.659	2.32	NA	NA			N	e
		Selenate-speciation	ND	ND	mg/kg		0/5	0.254/0.408	ND	NA	NA			N	b,e
		Selenite-speciation	1.58	1.58	mg/kg		1/5	0.343/0.529	1.58	NA	NA			N	e
		Selenium-speciation	0.821	3.9	mg/kg		5/5		3.9	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach C		Aluminum	1900	27100	mg/kg		10/10		27100	NA	NA			Y	a
		Antimony	ND	ND	mg/kg		0/10	1.26/1.58	ND	NA	NA			N	b
		Arsenic	1.79	5.17	mg/kg		7/10	1.38/1.58	5.17	NA	NA			Y	a
		Barium	17	447	mg/kg		10/10		447	NA	NA			Y	a
		Beryllium	0.541	1.09	mg/kg		3/10	0.506/0.633	1.09	NA	NA			Y	a
		Boron	9.05	10.3	mg/kg		2/10	5.06/6.33	10.3	NA	NA			Y	a
		Cadmium	ND	ND	mg/kg		0/10	0.126/0.158	ND	NA	NA			N	b
		Calcium	146	1200	mg/kg		10/10		1200	NA	NA			N	c
		Chromium	3.18	24.3	mg/kg		10/10		24.3	NA	NA			Y	a
		Cobalt	2.62	20.4	mg/kg		10/10		20.4	NA	NA			Y	a
		Copper	2	13.2	mg/kg		10/10		13.2	NA	NA			Y	a
		Hex. Chromium	ND	ND	mg/kg		0/2	0.55/0.62	ND	NA	NA			N	b
		Iron	3300	19100	mg/kg		10/10		19100	NA	NA			Y	a
		Lead	2.45	14	mg/kg		10/10		14	NA	NA			Y	a
		Magnesium	142	2920	mg/kg		10/10		2920	NA	NA			Y	a
		Manganese	34.4	2940	mg/kg		10/10		2940	NA	NA			Y	a
		Mercury	ND	ND	mg/kg		0/10	0.051/0.064	ND	NA	NA			N	b
		Molybdenum	ND	ND	mg/kg		0/10	5.06/6.33	ND	NA	NA			N	b
		Nickel	2.85	22.4	mg/kg		10/10		22.4	NA	NA			Y	a
		Potassium	169	3340	mg/kg		10/10		3340	NA	NA			N	c
		Selenium	ND	ND	mg/kg		0/10	1.26/1.58	ND	NA	NA			N	b
		Silver	ND	ND	mg/kg		0/10	0.632/0.791	ND	NA	NA			N	b
		Sodium	158	158	mg/kg		1/10	126/158	158	NA	NA			N	c
		Strontium	6.35	19.9	mg/kg		4/10	5.15/6.33	19.9	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0/10	1.26/1.58	ND	NA	NA			N	b
		Vanadium	3.1	36.6	mg/kg		10/10		36.6	NA	NA			Y	a
		Zinc	12	84.8	mg/kg		10/10		84.8	NA	NA			Y	a
		Acenaphthene	ND	ND	mg/kg		0/2	0.0007/0.0016	ND	NA	NA			N	b
		Acenaphthylene	ND	ND	mg/kg		0/2	0.0007/0.0016	ND	NA	NA			N	b
		Anthracene	0.0022	0.0022	mg/kg		1/2	0.0007/0.0007	0.0022	NA	NA			Y	a
		Benzo(a)anthracene	0.0017	0.019	mg/kg		2/2		0.019	NA	NA			Y	a
		Benzo(a)pyrene	0.0017	0.021	mg/kg		2/2		0.021	NA	NA			Y	a
		Benzo(b)fluoranthene	0.0026	0.036	mg/kg		2/2		0.036	NA	NA			Y	a
		Benzo(g,h,i)perylene	0.00097	0.011	mg/kg		2/2		0.011	NA	NA			Y	a
		Benzo(k)fluoranthene	0.0016	0.023	mg/kg		2/2		0.023	NA	NA			Y	a
		Chrysene	0.002	0.027	mg/kg		2/2		0.027	NA	NA			Y	a
		Dibenz(a,h)anthracene	0.0031	0.0031	mg/kg		1/2	0.0007/0.0007	0.0031	NA	NA			Y	a
		Fluoranthene	0.0038	0.049	mg/kg		2/2		0.049	NA	NA			Y	a

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Fluorene	0.0024	0.0024	mg/kg		1/2	0.0007/0.0007	0.0024	NA	NA			N	b
		Indeno(1,2,3-cd)pyrene	0.00091	0.011	mg/kg		2/2		0.011	NA	NA			Y	a
		Naphthalene	0.0088	0.0088	mg/kg		1/2	0.0007/0.0007	0.0088	NA	NA			Y	a
		Phenanthrene	0.0018	0.025	mg/kg		2/2		0.025	NA	NA			Y	a
		Pyrene	0.0033	0.041	mg/kg		2/2		0.041	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		PCB-1254	0.0029	0.0029	mg/kg		1/2	0.0018/0.0018	0.0029	NA	NA			Y	a
		PCB-1260	0.0041	0.0041	mg/kg		1/2	0.0018/0.0018	0.0041	NA	NA			Y	a
		PCB-1262	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		PCB-1268	ND	ND	mg/kg		0/2	0.0018/0.0021	ND	NA	NA			N	b
		4,4'-DDD	ND	ND	mg/kg		0/2	0.00068/0.00079	ND	NA	NA			N	b
		4,4'-DDE	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		4,4'-DDT	ND	ND	mg/kg		0/2	0.00068/0.00079	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			Y	a
		delta-BHC	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0/2	0.00069/0.00082	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0/2	0.00036/0.00042	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0/2	0.0036/0.0042	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0/2	0.036/0.042	ND	NA	NA			N	b
		Actinium-228	0.622	1.07	pCi/g		2/2		1.07	NA	NA			N	d
		Americium-241	ND	ND	pCi/g		0/2	94.6/185	ND	NA	NA			N	b
		Bismuth-214	0.541	0.945	pCi/g		2/2		0.945	NA	NA			N	d
		Cesium-137	0.0496	0.0496	pCi/g		1/2	0.0307/0.0307	0.0496	NA	NA			Y	a
		Cobalt-60	ND	ND	pCi/g		0/2	0.0299/0.03	ND	NA	NA			N	b
		Lead-212	0.553	1.16	pCi/g		2/2		1.16	NA	NA			N	d
		Lead-214	0.693	1.18	pCi/g		2/2		1.18	NA	NA			N	d

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Potassium-40	3.64	7.43	pCi/g		2/2		7.43	NA	NA			Y	a
		Radium-226	0.541	0.945	pCi/g		2/2		0.945	NA	NA			Y	a
		Radium-228	0.622	1.07	pCi/g		2/2		1.07	NA	NA			Y	a
		Thallium-208	0.183	0.309	pCi/g		2/2		0.309	NA	NA			N	d
		Thorium-228	0.492	0.81	pCi/g		2/2		0.81	NA	NA			Y	a
		Thorium-230	0.38	5.21	pCi/g		2/2		5.21	NA	NA			Y	a
		Thorium-232	0.338	0.961	pCi/g		2/2		0.961	NA	NA			Y	a
		Thorium-234	2.36	2.36	pCi/g		1/2	1.68/1.68	2.36	NA	NA			Y	a
		Uranium-234	0.484	0.871	pCi/g		2/2		0.871	NA	NA			Y	a
		Uranium-235	0.0331	0.0532	pCi/g		2/2		0.0532	NA	NA			Y	a
		Uranium-238	0.476	0.809	pCi/g		2/2		0.809	NA	NA			Y	a
		Arsenate-speciation	1.15	2.02	mg/kg		2/2		2.02	NA	NA			N	e
		Arsenic-speciation	2.76	3.08	mg/kg		2/2		3.08	NA	NA			N	e
		Arsenite-speciation	0.214	0.98	mg/kg		2/2		0.98	NA	NA			N	e
		Inorganic Arsenic-speciation	2.13	2.23	mg/kg		2/2		2.23	NA	NA			N	e
		Inorganic Mercury-speciation	0.0236	0.0239	mg/kg		2/2		0.0239	NA	NA			N	e
		Inorganic Selenium-speciation	ND	ND	mg/kg		0/2	0.397/0.452	ND	NA	NA			N	e
		Mercury-speciation	0.0236	0.0243	mg/kg		2/2		0.0243	NA	NA			N	e
		Methyl mercury-speciation	0.000093	0.000379	mg/kg		2/2		0.000379	NA	NA			N	e
		Organic Arsenic-speciation	0.624	0.847	mg/kg		2/2		0.847	NA	NA			N	e
		Organic Selenium-speciation	ND	ND	mg/kg		0/2	0.699/0.779	ND	NA	NA			N	b,e
		Selenate-speciation	ND	ND	mg/kg		0/2	0.314/0.315	ND	NA	NA			N	b,e
		Selenite-speciation	ND	ND	mg/kg		0/2	0.397/0.452	ND	NA	NA			N	b,e
		Selenium-speciation	ND	ND	mg/kg		0/2	0.699/0.779	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reference Reach		Aluminum	2480	14800	mg/kg		5/5		14800	NA	NA			Y	a
		Antimony	ND	ND	mg/kg		0/5	1.19/1.6	ND	NA	NA			N	b
		Arsenic	1.83	5.4	mg/kg		4/5	1.36/1.36	5.4	NA	NA			Y	a
		Barium	22.6	90.4	mg/kg		5/5		90.4	NA	NA			Y	a
		Beryllium	0.769	0.769	mg/kg		1/5	0.476/0.619	0.769	NA	NA			Y	a
		Boron	ND	ND	mg/kg		0/5	4.76/6.41	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0/5	0.119/0.16	ND	NA	NA			N	b
		Calcium	322	1630	mg/kg		5/5		1630	NA	NA			N	c
		Chromium	3.21	13.8	mg/kg		5/5		13.8	NA	NA			Y	a
		Cobalt	2.15	10.5	mg/kg		5/5		10.5	NA	NA			Y	a
		Copper	4.03	6.83	mg/kg		5/5		6.83	NA	NA			Y	a
		Hex. Chromium	0.37	0.37	mg/kg		1/2	1.6/1.6	0.37	NA	NA			Y	a
		Iron	3210	18500	mg/kg		5/5		18500	NA	NA			Y	a
		Lead	3.15	10.4	mg/kg		5/5		10.4	NA	NA			Y	a
		Magnesium	189	1490	mg/kg		5/5		1490	NA	NA			Y	a
		Manganese	29.9	689	mg/kg		5/5		689	NA	NA			Y	a
		Mercury	ND	ND	mg/kg		0/5	0.047/0.064	ND	NA	NA			N	b
		Molybdenum	ND	ND	mg/kg		0/5	4.76/6.41	ND	NA	NA			N	b
		Nickel	3.42	14.7	mg/kg		5/5		14.7	NA	NA			Y	a
		Potassium	297	1480	mg/kg		5/5		1480	NA	NA			N	c
		Selenium	ND	ND	mg/kg		0/5	1.19/1.6	ND	NA	NA			b	a
		Silver	ND	ND	mg/kg		0/5	0.595/0.801	ND	NA	NA			N	b
		Sodium	ND	ND	mg/kg		0/5	119/160	ND	NA	NA			N	c
		Strontium	5.31	16.3	mg/kg		3/5	5.43/6.19	16.3	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0/5	1.19/1.6	ND	NA	NA			N	b
		Vanadium	4.05	26.3	mg/kg		5/5		26.3	NA	NA			Y	a
		Zinc	15	54.1	mg/kg		5/5		54.1	NA	NA			Y	a
		Acenaphthene	ND	ND	mg/kg		0/2	0.00061/0.00084	ND	NA	NA			N	b
		Acenaphthylene	ND	ND	mg/kg		0/2	0.00061/0.00084	ND	NA	NA			N	b
		Anthracene	0.0023	0.0023	mg/kg		1/2	0.00061/0.00061	0.0023	NA	NA			Y	a
		Benzo(a)anthracene	0.0013	0.016	mg/kg		2/2		0.016	NA	NA			Y	a
		Benzo(a)pyrene	0.0015	0.016	mg/kg		2/2		0.016	NA	NA			Y	a
		Benzo(b)fluoranthene	0.0019	0.028	mg/kg		2/2		0.028	NA	NA			Y	a
		Benzo(g,h,i)perylene	0.001	0.0065	mg/kg		2/2		0.0065	NA	NA			Y	a
		Benzo(k)fluoranthene	0.0017	0.017	mg/kg		2/2		0.017	NA	NA			Y	a
		Chrysene	0.0016	0.019	mg/kg		2/2		0.019	NA	NA			Y	a
		Dibenz(a,h)anthracene	0.0022	0.0022	mg/kg		1/2	0.00061/0.00061	0.0022	NA	NA			Y	a
		Fluoranthene	0.0032	0.034	mg/kg		2/2		0.034	NA	NA			Y	a

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Fluorene	0.0022	0.0022	mg/kg		1/2	0.00061/0.00061	0.0022	NA	NA			Y	a
		Indeno(1,2,3-cd)pyrene	0.001	0.0068	mg/kg		2/2		0.0068	NA	NA			Y	a
		Naphthalene	0.0039	0.0039	mg/kg		1/2	0.00061/0.00061	0.0039	NA	NA			Y	a
		Phenanthrene	0.0022	0.017	mg/kg		2/2		0.017	NA	NA			Y	a
		Pyrene	0.0029	0.033	mg/kg		2/2		0.033	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1254	0.0032	0.0032	mg/kg		1/2	0.0016/0.0016	0.0032	NA	NA			Y	a
		PCB-1260	0.0046	0.0046	mg/kg		1/2	0.0016/0.0016	0.0046	NA	NA			Y	a
		PCB-1262	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1268	ND	ND	mg/kg		0/2	0.0016/0.0021	ND	NA	NA			N	b
		4,4'-DDD	ND	ND	mg/kg		0/2	0.00062/0.00082	ND	NA	NA			N	b
		4,4'-DDE	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		4,4'-DDT	ND	ND	mg/kg		0/2	0.00062/0.00082	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		beta-BHC	0.00073	0.00073	mg/kg		1/2	0.00031/0.00031	0.00073	NA	NA			Y	a
		delta-BHC	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0/2	0.00061/0.00083	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0/2	0.00031/0.00043	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0/2	0.0031/0.0043	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0/2	0.031/0.043	ND	NA	NA			N	b
		Actinium-228	0.605	0.734	pCi/g		2/2		0.734	NA	NA			N	d
		Americium-241	ND	ND	pCi/g		0/2	36.1/210	ND	NA	NA			N	b
		Bismuth-214	0.598	0.689	pCi/g		2/2		0.689	NA	NA			N	d
		Cesium-137	0.049	0.049	pCi/g		1/2	0.0353/0.0353	0.049	NA	NA			Y	a
		Cobalt-60	ND	ND	pCi/g		0/2	0.0297/0.0362	ND	NA	NA			N	b
		Lead-212	0.619	0.691	pCi/g		2/2		0.691	NA	NA			N	d
		Lead-214	0.717	0.764	pCi/g		2/2		0.764	NA	NA			N	d

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Potassium-40	4.27	5.1	pCi/g		2/2		5.1	NA	NA			Y	a
		Radium-226	0.598	0.689	pCi/g		2/2		0.689	NA	NA			Y	a
		Radium-228	0.605	0.734	pCi/g		2/2		0.734	NA	NA			Y	a
		Thallium-208	0.202	0.227	pCi/g		2/2		0.227	NA	NA			N	d
		Thorium-228	0.545	0.874	pCi/g		2/2		0.874	NA	NA			Y	a
		Thorium-230	0.494	0.516	pCi/g		2/2		0.516	NA	NA			Y	a
		Thorium-232	0.483	0.72	pCi/g		2/2		0.72	NA	NA			Y	a
		Thorium-234	1.27	1.27	pCi/g		1/2	1.62/1.62	1.27	NA	NA			Y	a
		Uranium-234	0.483	0.497	pCi/g		2/2		0.497	NA	NA			Y	a
		Uranium-235	0.0453	0.0648	pCi/g		2/2		0.0648	NA	NA			Y	a
		Uranium-238	0.513	0.515	pCi/g		2/2		0.515	NA	NA			Y	a
		Arsenate-speciation	1.4	2.34	mg/kg		2/2		2.34	NA	NA			N	e
		Arsenic-speciation	2.94	2.96	mg/kg		2/2		2.96	NA	NA			N	e
		Arsenite-speciation	0.204	0.425	mg/kg		2/2		0.425	NA	NA			N	e
		Inorganic Arsenic-speciation	1.83	2.54	mg/kg		2/2		2.54	NA	NA			N	e
		Inorganic Mercury-speciation	0.0164	0.0335	mg/kg		2/2		0.0335	NA	NA			N	e
		Inorganic Selenium-speciation	ND	ND	mg/kg		0/2	0.424/0.525	ND	NA	NA			N	e
		Mercury-speciation	0.0164	0.0345	mg/kg		2/2		0.0345	NA	NA			N	e
		Methyl mercury-speciation	0.000024	0.00105	mg/kg		2/2		0.00105	NA	NA			N	e
		Organic Arsenic-speciation	0.415	1.11	mg/kg		2/2		1.11	NA	NA			N	e
		Organic Selenium-speciation	ND	ND	mg/kg		0/2	0.607/0.924	ND	NA	NA			N	b,e
		Selenate-speciation	ND	ND	mg/kg		0/2	0.335/0.415	ND	NA	NA			N	b,e
		Selenite-speciation	ND	ND	mg/kg		0/2	0.424/0.525	ND	NA	NA			N	b,e
		Selenium-speciation	ND	ND	mg/kg		0/2	0.607/0.924	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.14
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach A		Aluminum	7370	143000	mg/kg		12/12		143000	NA	NA			Y	a
		Antimony	1.32	2.52	mg/kg		3/12	1.25/1.63	2.52	NA	NA			Y	a
		Arsenic	5.2	63.4	mg/kg		12/12		63.4	NA	NA			Y	a
		Barium	50.7	190	mg/kg		12/12		190	NA	NA			Y	a
		Beryllium	0.623	4.39	mg/kg		10/12	0.502/0.524	4.39	NA	NA			Y	a
		Boron	8.63	60.5	mg/kg		12/12		60.5	NA	NA			Y	a
		Cadmium	ND	ND	mg/kg		0/12	0.125/0.164	ND	NA	NA			N	b
		Calcium	440	3430	mg/kg		12/12		3430	NA	NA			N	c
		Chromium	14.8	125	mg/kg		12/12		125	NA	NA			Y	a
		Cobalt	4.52	18	mg/kg		12/12		18	NA	NA			Y	a
		Copper	5.52	90.4	mg/kg		12/12		90.4	NA	NA			Y	a
		Hex. Chromium	0.83	0.83	mg/kg		1/3	0.27/0.29	0.83	NA	NA			Y	a
		Iron	14500	93800	mg/kg		12/12		93800	NA	NA			Y	a
		Lead	12.1	102	mg/kg		12/12		102	NA	NA			Y	a
		Magnesium	400	5780	mg/kg		12/12		5780	NA	NA			Y	a
		Manganese	160	1700	mg/kg		12/12		1700	NA	NA			Y	a
		Mercury	0.07	0.39	mg/kg		10/12	0.055/0.059	0.39	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0/12	5.02/6.55	ND	NA	NA			N	b
		Nickel	3.24	135	mg/kg		12/12		135	NA	NA			Y	a
		Potassium	443	8880	mg/kg		12/12		8880	NA	NA			N	c
		Selenium	ND	ND	mg/kg		0/12	1.25/1.64	ND	NA	NA			N	b
		Silver	ND	ND	mg/kg		0/12	0.627/0.819	ND	NA	NA			N	b
		Sodium	199	284	mg/kg		4/12	125/163	284	NA	NA			N	c
		Strontium	6.27	43.6	mg/kg		12/12		43.6	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0/12	1.25/1.64	ND	NA	NA			N	b
		Vanadium	21.1	193	mg/kg		12/12		193	NA	NA			Y	a
		Zinc	27.5	460	mg/kg		12/12		460	NA	NA			Y	a
		Acenaphthene	ND	ND	mg/kg		0/3	0.00064/0.00073	ND	NA	NA			N	b
		Acenaphthylene	0.00079	0.00079	mg/kg		1/3	0.00064/0.00071	0.00079	NA	NA			Y	a
		Anthracene	0.0009	0.0011	mg/kg		2/3	0.00071/0.00071	0.0011	NA	NA			Y	a
		Benzo(a)anthracene	0.00078	0.0083	mg/kg		3/3		0.0083	NA	NA			Y	a
		Benzo(a)pyrene	0.00087	0.0091	mg/kg		3/3		0.0091	NA	NA			Y	a
		Benzo(b)fluoranthene	0.0012	0.011	mg/kg		3/3		0.011	NA	NA			Y	a
		Benzo(g,h,i)perylene	0.00082	0.0064	mg/kg		3/3		0.0064	NA	NA			Y	a
		Benzo(k)fluoranthene	0.00091	0.0097	mg/kg		3/3		0.0097	NA	NA			Y	a
		Chrysene	0.0012	0.0093	mg/kg		3/3		0.0093	NA	NA			Y	a
		Dibenz(a,h)anthracene	0.0015	0.0022	mg/kg		2/3	0.00071/0.00071	0.0022	NA	NA			Y	a

TABLE 2.14
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Fluoranthene	0.002	0.018	mg/kg		3/3		0.018	NA	NA			Y	a
		Fluorene	0.00081	0.00081	mg/kg		1/3	0.00071/0.00073	0.00081	NA	NA			Y	a
		Indeno(1,2,3-cd)pyrene	0.0039	0.0061	mg/kg		2/3	0.00071/0.00071	0.0061	NA	NA			Y	a
		Naphthalene	0.0008	0.0024	mg/kg		3/3		0.0024	NA	NA			Y	a
		Phenanthrene	0.0012	0.0081	mg/kg		3/3		0.0081	NA	NA			Y	a
		Pyrene	0.0016	0.013	mg/kg		3/3		0.013	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		PCB-1254	0.0082	0.0082	mg/kg		1/3	0.0018/0.0018	0.0082	NA	NA			Y	a
		PCB-1260	0.0027	0.0061	mg/kg		2/3	0.0018/0.0018	0.0061	NA	NA			Y	a
		PCB-1262	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		PCB-1268	ND	ND	mg/kg		0/3	0.0016/0.0018	ND	NA	NA			N	b
		4,4'-DDD	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		4,4'-DDE	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		4,4'-DDT	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		beta-BHC	0.00083	0.00083	mg/kg		1/3	0.00036/0.00037	0.00083	NA	NA			Y	a
		delta-BHC	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0/3	0.00064/0.00071	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		Heptachlor	0.00035	0.00035	mg/kg		1/3	0.00036/0.00037	0.00035	NA	NA			Y	a
		Heptachlor Epoxide	ND	ND	mg/kg		0/3	0.00033/0.00037	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0/3	0.0033/0.0037	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0/3	0.033/0.037	ND	NA	NA			N	b
		Actinium-228	0.453	2.02	pCi/g		3/3		2.02	NA	NA			N	d
		Americium-241	ND	ND	pCi/g		0/3	119/451	ND	NA	NA			N	b
		Bismuth-214	0.417	1.63	pCi/g		3/3		1.63	NA	NA			N	d
		Cesium-137	1.01	1.07	pCi/g		2/3	0.0852/0.0852	1.07	NA	NA			Y	a
		Cobalt-60	ND	ND	pCi/g		0/3	0.038/0.0749	ND	NA	NA			N	b
		Lead-212	0.577	2.16	pCi/g		3/3		2.16	NA	NA			N	d

TABLE 2.14
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Lead-214	0.536	1.92	pCi/g		3/3		1.92	NA	NA			N	d
		Potassium-40	3.32	21.6	pCi/g		3/3		21.6	NA	NA			Y	a
		Radium-226	0.417	1.63	pCi/g		3/3		1.63	NA	NA			Y	a
		Radium-228	0.453	2.02	pCi/g		3/3		2.02	NA	NA			Y	a
		Thallium-208	0.19	0.691	pCi/g		3/3		0.691	NA	NA			N	d
		Thorium-228	0.547	2.51	pCi/g		3/3		2.51	NA	NA			Y	a
		Thorium-230	0.571	1.61	pCi/g		3/3		1.61	NA	NA			Y	a
		Thorium-232	0.492	1.84	pCi/g		3/3		1.84	NA	NA			Y	a
		Thorium-234	ND	ND	pCi/g		0/3	1.01/3.38	ND	NA	NA			N	b
		Uranium-234	0.419	1.52	pCi/g		3/3		1.52	NA	NA			Y	a
		Uranium-235	0.0783	0.206	pCi/g		2/3	0.0877/0.0877	0.206	NA	NA			Y	a
		Uranium-238	0.317	1.42	pCi/g		3/3		1.42	NA	NA			Y	a
		Arsenate-speciation	1.9	23.3	mg/kg		2/3	8.61/8.61	23.3	NA	NA			N	e
		Arsenic-speciation	8.43	30.2	mg/kg		3/3		30.2	NA	NA			N	e
		Arsenite-speciation	0.192	2.99	mg/kg		3/3		2.99	NA	NA			N	e
		Inorganic Arsenic-speciation	2.09	25.1	mg/kg		3/3		25.1	NA	NA			N	e
		Inorganic Mercury-speciation	0.114	0.366	mg/kg		3/3		0.366	NA	NA			N	e
		Inorganic Selenium-speciation	0.404	0.454	mg/kg		2/3	0.315/0.315	0.454	NA	NA			N	e
		Mercury-speciation	0.114	0.366	mg/kg		3/3		0.366	NA	NA			N	e
		Methyl mercury-speciation	0.000028	0.00013	mg/kg		3/3		0.00013	NA	NA			N	e
		Organic Arsenic-speciation	5.06	11.1	mg/kg		2/3	8.61/8.61	11.1	NA	NA			N	e
		Organic Selenium-speciation	0.733	0.733	mg/kg		1/3	0.43/0.679	0.733	NA	NA			N	e
		Selenate-speciation	ND	ND	mg/kg		0/3	0.25/0.278	ND	NA	NA			N	b,e
		Selenite-speciation	0.404	0.454	mg/kg		2/3	0.315/0.315	0.454	NA	NA			N	e
		Selenium-speciation	0.733	1.04	mg/kg		3/3		1.04	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach B		Aluminum	9870	59400	mg/kg		13/13		59400	NA	NA			Y	a
		Antimony	1.3	1.73	mg/kg		3/13	1.23/2.95	1.73	NA	NA			Y	a
		Arsenic	7.31	82.6	mg/kg		13/13		82.6	NA	NA			Y	a
		Barium	50.2	216	mg/kg		13/13		216	NA	NA			Y	a
		Beryllium	0.498	1.7	mg/kg		8/13	0.491/1.18	1.7	NA	NA			Y	a
		Boron	8.02	45.7	mg/kg		12/13	11.8/11.8	45.7	NA	NA			Y	a
		Cadmium	ND	ND	mg/kg		0/13	0.12/0.295	ND	NA	NA			N	b
		Calcium	262	4140	mg/kg		13/13		4140	NA	NA			N	c
		Chromium	13.4	71.3	mg/kg		13/13		71.3	NA	NA			Y	a
		Cobalt	4.55	23.8	mg/kg		13/13		23.8	NA	NA			Y	a
		Copper	7.2	46.8	mg/kg		13/13		46.8	NA	NA			Y	a
		Hex. Chromium	0.34	0.84	mg/kg		2/4	0.26/0.33	0.84	NA	NA			Y	a
		Iron	14800	49200	mg/kg		13/13		49200	NA	NA			Y	a
		Lead	12.3	86.7	mg/kg		13/13		86.7	NA	NA			Y	a
		Magnesium	807	7150	mg/kg		13/13		7150	NA	NA			Y	a
		Manganese	145	3540	mg/kg		13/13		3540	NA	NA			Y	a
		Mercury	0.065	1	mg/kg		11/13	0.051/0.055	1	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0/13	4.8/11.8	ND	NA	NA			N	b
		Nickel	5.81	36.9	mg/kg		13/13		36.9	NA	NA			Y	a
		Potassium	983	18100	mg/kg		13/13		18100	NA	NA			N	c
		Selenium	1.77	1.77	mg/kg		1/13	1.2/2.95	1.77	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0/13	0.6/1.48	ND	NA	NA			N	b
		Sodium	178	219	mg/kg		3/13	120/295	219	NA	NA			N	c
		Strontium	7.27	42.1	mg/kg		13/13		42.1	NA	NA			Y	a
		Thallium	1.35	3.11	mg/kg		3/13	1.2/2.95	3.11	NA	NA			Y	a
		Vanadium	22.9	63.5	mg/kg		13/13		63.5	NA	NA			Y	a
		Zinc	30.3	194	mg/kg		13/13		194	NA	NA			Y	a
		Acenaphthene	ND	ND	mg/kg		0/3	0.00061/0.00082	ND	NA	NA			N	b
		Acenaphthylene	ND	ND	mg/kg		0/3	0.00061/0.00082	ND	NA	NA			N	b
		Anthracene	0.0019	0.0019	mg/kg		1/3	0.00061/0.00082	0.0019	NA	NA			Y	a
		Benzo(a)anthracene	0.0008	0.015	mg/kg		3/3		0.015	NA	NA			Y	a
		Benzo(a)pyrene	0.00096	0.014	mg/kg		3/3		0.014	NA	NA			Y	a
		Benzo(b)fluoranthene	0.0015	0.023	mg/kg		3/3		0.023	NA	NA			Y	a
		Benzo(g,h,i)perylene	0.00067	0.01	mg/kg		3/3		0.01	NA	NA			Y	a
		Benzo(k)fluoranthene	0.001	0.016	mg/kg		3/3		0.016	NA	NA			Y	a
		Chrysene	0.0011	0.018	mg/kg		3/3		0.018	NA	NA			Y	a
		Dibenz(a,h)anthracene	0.0031	0.0031	mg/kg		1/3	0.00061/0.00082	0.0031	NA	NA			Y	a
		Fluoranthene	0.0016	0.026	mg/kg		3/3		0.026	NA	NA			Y	a

TABLE 2.15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Fluorene	0.0019	0.0019	mg/kg		1/3	0.00061/0.00082	0.0019	NA	NA			Y	a
		Indeno(1,2,3-cd)pyrene	0.00065	0.0086	mg/kg		3/3		0.0086	NA	NA			Y	a
		Naphthalene	0.0061	0.0061	mg/kg		1/3	0.00061/0.00082	0.0061	NA	NA			Y	a
		Phenanthrene	0.0009	0.013	mg/kg		3/3		0.013	NA	NA			Y	a
		Pyrene	0.0015	0.03	mg/kg		3/3		0.03	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1254	0.014	0.014	mg/kg		1/3	0.0016/0.0021	0.014	NA	NA			Y	a
		PCB-1260	0.011	0.011	mg/kg		1/3	0.0016/0.0021	0.011	NA	NA			Y	a
		PCB-1262	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		PCB-1268	ND	ND	mg/kg		0/3	0.0016/0.0021	ND	NA	NA			N	b
		4,4'-DDD	0.0012	0.0012	mg/kg		1/3	0.00061/0.0008	0.0012	NA	NA			Y	a
		4,4'-DDE	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		4,4'-DDT	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		alpha-BHC	0.00047	0.00047	mg/kg		1/3	0.00031/0.00033	0.00047	NA	NA			Y	a
		alpha-Chlordane	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		beta-BHC	0.00067	0.00067	mg/kg		1/3	0.00031/0.00033	0.00067	NA	NA			Y	a
		delta-BHC	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0/3	0.00061/0.0008	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0/3	0.00031/0.00041	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0/3	0.0031/0.0041	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0/3	0.031/0.041	ND	NA	NA			N	b
		Actinium-228	0.826	1.88	pCi/g		3/3		1.88	NA	NA			N	d
		Americium-241	ND	ND	pCi/g		0/3	119/268	ND	NA	NA			N	b
		Bismuth-214	0.61	0.925	pCi/g		3/3		0.925	NA	NA			N	d
		Cesium-137	0.376	2.84	pCi/g		3/3		2.84	NA	NA			Y	a
		Cobalt-60	ND	ND	pCi/g		0/3	0.0433/0.0719	ND	NA	NA			N	b
		Lead-212	1.03	1.59	pCi/g		3/3		1.59	NA	NA			N	d
		Lead-214	0.823	0.873	pCi/g		3/3		0.873	NA	NA			N	d
		Potassium-40	6.94	28.1	pCi/g		3/3		28.1	NA	NA			Y	a

TABLE 2.15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Radium-226	0.61	0.925	pCi/g		3/3		0.925	NA	NA			Y	a
		Radium-228	0.826	1.88	pCi/g		3/3		1.88	NA	NA			Y	a
		Thallium-208	0.267	0.411	pCi/g		3/3		0.411	NA	NA			N	d
		Thorium-228	0.835	1.42	pCi/g		3/3		1.42	NA	NA			Y	a
		Thorium-230	0.952	1.24	pCi/g		3/3		1.24	NA	NA			Y	a
		Thorium-232	0.69	1.36	pCi/g		3/3		1.36	NA	NA			Y	a
		Thorium-234	2.08	2.08	pCi/g		1/3	1.82/2.3	2.08	NA	NA			Y	a
		Uranium-234	0.79	1.2	pCi/g		3/3		1.2	NA	NA			Y	a
		Uranium-235	ND	ND	pCi/g		0/3	0.0835/0.145	ND	NA	NA			N	b
		Uranium-238	1.04	1.15	pCi/g		3/3		1.15	NA	NA			Y	a
		Arsenate-speciation	7.39	10.9	mg/kg		3/3		10.9	NA	NA			N	e
		Arsenic-speciation	5.4	13.1	mg/kg		3/3		13.1	NA	NA			N	e
		Arsenite-speciation	1.17	3.74	mg/kg		3/3		3.74	NA	NA			N	e
		Inorganic Arsenic-speciation	8.56	14.6	mg/kg		3/3		14.6	NA	NA			N	e
		Inorganic Mercury-speciation	0.0673	1.21	mg/kg		3/3		1.21	NA	NA			N	e
		Inorganic Selenium-speciation	ND	ND	mg/kg		0/3	0.301/0.439	ND	NA	NA			N	b,e
		Mercury-speciation	0.0675	1.21	mg/kg		3/3		1.21	NA	NA			N	e
		Methyl mercury-speciation	0.000167	0.00125	mg/kg		3/3		0.00125	NA	NA			N	e
		Organic Arsenic-speciation	ND	ND	mg/kg		0/3	1.23/1.88	ND	NA	NA			N	b,e
		Organic Selenium-speciation	0.766	0.961	mg/kg		3/3		0.961	NA	NA			N	e
		Selenate-speciation	ND	ND	mg/kg		0/3	0.239/0.348	ND	NA	NA			N	b,e
		Selenite-speciation	ND	ND	mg/kg		0/3	0.301/0.439	ND	NA	NA			N	b,e
		Selenium-speciation	0.766	0.961	mg/kg		3/3		0.961	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Speciated inorganic constituents were not retained as COPCs but were evaluated using the results for the total inorganic constituents (e.g., Arsenate was evaluated using the data for Arsenic, Total)

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach A		Aluminum	ND	ND	mg/kg		0 / 12	3.5 / 8.3	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.03	ND	NA	NA			N	b
		Arsenic	0.074	0.38	mg/kg		12 / 12		0.38	NA	NA			N	b,e
		Barium	0.056	0.056	mg/kg		1 / 12	0.04 / 0.095	0.056	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 12	0.026 / 0.061	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.36 / 0.86	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0067 / 0.016	ND	NA	NA			N	b
		Calcium	144	941	mg/kg		12 / 12		941	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 12	0.11 / 0.26	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 12	0.012 / 0.029	ND	NA	NA			N	b
		Copper	0.18	0.44	mg/kg		11 / 12	0.13 / 0.3	0.44	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.6 / 25	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 12	0.024 / 0.029	ND	NA	NA			N	b
		Magnesium	247	353	mg/kg		12 / 12		353	NA	NA			Y	c
		Manganese	0.17	0.29	mg/kg		6 / 12	0.15 / 0.35	0.29	NA	NA			Y	a
		Mercury	0.0639	0.298	mg/kg		12 / 12		0.298	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.031 / 0.073	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 12	0.086 / 0.2	ND	NA	NA			N	b
		Potassium	3120	4290	mg/kg		9 / 12	670 / 3730	4290	NA	NA			N	c
		Selenium	0.5	0.81	mg/kg		12 / 12		0.81	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0025 / 0.006	ND	NA	NA			N	b
		Sodium	366	628	mg/kg		12 / 12		628	NA	NA			Y	c
		Strontium	0.074	0.75	mg/kg		12 / 12		0.75	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.013 / 0.035	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.04 / 0.095	ND	NA	NA			N	b
		Zinc	5.7	20.3	mg/kg		12 / 12		20.3	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 4	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 4	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 4	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 4	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 4	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	ND	ND	mg/kg		0 / 4	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1260	0.0603	0.158	mg/kg		4 / 4		0.158	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0065	0.0065	mg/kg		1 / 4	0.005 / 0.005	0.0065	NA	NA			Y	a
		4,4'-DDT	0.0052	0.0052	mg/kg		1 / 4	0.005 / 0.005	0.0052	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		beta-BHC	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b

TABLE 2.16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Endosulfan I	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 4	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 4	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 4	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 4	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.1215 / 0.1215	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.07096 / 0.07096	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.06066 / 0.06066	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02869 / 0.02869	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02847 / 0.02847	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.04358 / 0.04358	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.05256 / 0.05256	ND	NA	NA			N	b,d
		Potassium-40	2.978	2.978	pCi/g		1 / 1		2.978	NA	NA			Y	a
		Radium-226	0.1426	0.1426	pCi/g		1 / 1		0.1426	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.1215 / 0.1215	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.02387 / 0.02387	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.1524 / 0.1524	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.083 / 0.083	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.1053 / 0.1053	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.668 / 0.668	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.04249 / 0.04249	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.08366 / 0.08366	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.04249 / 0.04249	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 9	0.003 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.228	0.435	mg/kg		8 / 9	0.117 / 0.163	0.435	NA	NA			N	e
		Arsenite	0.005	0.005	mg/kg		1 / 9	0.0005 / 0.002	0.005	NA	NA			Y	e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 9	0.003 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.228	0.435	mg/kg		8 / 9	0.117 / 0.163	0.435	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.17
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach A		Aluminum	ND	ND	mg/kg		0 / 16	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 16	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.039	0.27	mg/kg		16 / 16		0.27	NA	NA			N	a, e
		Barium	0.051	0.24	mg/kg		9 / 16	0.042 / 0.047	0.24	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 16	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 16	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 16	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	110	1750	mg/kg		16 / 16		1750	NA	NA			N	c
		Chromium	0.18	0.27	mg/kg		3 / 16	0.12 / 0.13	0.27	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 16	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.23	0.94	mg/kg		16 / 16		0.94	NA	NA			Y	a
		Iron	13.9	13.9	mg/kg		1 / 16	11 / 12.5	13.9	NA	NA			Y	a
		Lead	0.084	0.084	mg/kg		1 / 16	0.025 / 0.029	0.084	NA	NA			Y	a
		Magnesium	245	382	mg/kg		16 / 16		382	NA	NA			Y	c
		Manganese	0.23	1.1	mg/kg		12 / 16	0.16 / 0.17	1.1	NA	NA			Y	a
		Mercury	0.031	0.14	mg/kg		16 / 16		0.14	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 16	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.16	mg/kg		2 / 16	0.089 / 0.1	0.16	NA	NA			Y	a
		Potassium	3250	4000	mg/kg		16 / 16		4000	NA	NA			N	c
		Selenium	0.56	1.3	mg/kg		16 / 16		1.3	NA	NA			Y	a
		Silver	0.011	0.025	mg/kg		5 / 16	0.0026 / 0.003	0.025	NA	NA			Y	a
		Sodium	273	461	mg/kg		16 / 16		461	NA	NA			Y	c
		Strontium	0.069	2	mg/kg		16 / 16		2	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 16	0.013 / 0.015	ND	NA	NA			N	b
		Vanadium	0.059	0.059	mg/kg		1 / 16	0.042 / 0.047	0.059	NA	NA			Y	a
		Zinc	10.9	21.7	mg/kg		16 / 16		21.7	NA	NA			Y	a
		Arsenate	ND	ND	mg/kg		0 / 8	0.002 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 8	0.11 / 0.191	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0008 / 0.002	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.002 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 8	0.11 / 0.191	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.18
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach A		Aluminum	ND	ND	mg/kg		0 / 11	3.6 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 11	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.042	0.081	mg/kg		5 / 11	0.025 / 0.029	0.081	NA	NA			N	a, e
		Barium	0.062	0.17	mg/kg		2 / 11	0.041 / 0.048	0.17	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 11	0.026 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 11	0.37 / 0.43	ND	NA	NA			N	b
		Cadmium	0.018	0.018	mg/kg		1 / 11	0.0068 / 0.0077	0.018	NA	NA			Y	a
		Calcium	57.3	1760	mg/kg		11 / 11		1760	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 11	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	0.016	0.016	mg/kg		1 / 11	0.012 / 0.015	0.016	NA	NA			Y	a
		Copper	0.26	10.3	mg/kg		11 / 11		10.3	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 11	10.7 / 12.5	ND	NA	NA			N	b
		Lead	0.19	0.44	mg/kg		2 / 11	0.025 / 0.029	0.44	NA	NA			Y	a
		Magnesium	227	272	mg/kg		11 / 11		272	NA	NA			Y	c
		Manganese	0.2	1	mg/kg		6 / 11	0.15 / 0.18	1	NA	NA			Y	a
		Mercury	0.042	0.11	mg/kg		11 / 11		0.11	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 11	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.5	mg/kg		3 / 11	0.087 / 0.1	0.5	NA	NA			Y	a
		Potassium	3510	4320	mg/kg		11 / 11		4320	NA	NA			N	c
		Selenium	0.29	0.53	mg/kg		11 / 11		0.53	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 11	0.0026 / 0.0041	ND	NA	NA			N	b
		Sodium	288	441	mg/kg		11 / 11		441	NA	NA			Y	c
		Strontium	0.054	1.2	mg/kg		11 / 11		1.2	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 11	0.012 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 11	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	4.8	12.8	mg/kg		11 / 11		12.8	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.0557	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.0557	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.0557	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.0557	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.0557	ND	NA	NA			N	b
		PCB-1254	0.0592	0.121	mg/kg		3 / 3		0.121	NA	NA			Y	a
		PCB-1260	0.119	0.309	mg/kg		3 / 3		0.309	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		4,4'-DDE	0.0081	0.0154	mg/kg		3 / 3		0.0154	NA	NA			Y	a
		4,4'-DDT	0.0064	0.0093	mg/kg		2 / 3	0.005 / 0.005	0.0093	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		alpha-Chlordane	0.0026	0.009	mg/kg		3 / 3		0.009	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b

TABLE 2.18
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.0056	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		gamma-Chlordane	0.0057	0.0057	mg/kg		1 / 3	0.0025 / 0.0025	0.0057	NA	NA			Y	a
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0028	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.0279	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.0836	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.1029 / 0.1029	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.06814 / 0.06814	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.05427 / 0.05427	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02271 / 0.02271	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02593 / 0.02593	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.03839 / 0.03839	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04643 / 0.04643	ND	NA	NA			N	b,d
		Potassium-40	3.578	3.578	pCi/g		1 / 1		3.578	NA	NA			Y	a
		Radium-226	0.1095	0.1095	pCi/g		1 / 1		0.1095	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.1029 / 0.1029	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.02432 / 0.02432	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.1184 / 0.1184	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.07859 / 0.07859	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.04241 / 0.04241	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.597 / 0.597	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.0392 / 0.0392	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.04864 / 0.04864	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.07256 / 0.07256	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.003 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 8	0.126 / 0.192	ND	NA	NA			N	b,e
		Arsenite	0.0004	0.009	mg/kg		3 / 8	0.0004 / 0.003	0.009	NA	NA			Y	e
		Inorganic Arsenic	0.009	0.009	mg/kg		1 / 8	0.003 / 0.005	0.009	NA	NA			N	e
		Organic Arsenic	ND	ND	mg/kg		0 / 8	0.126 / 0.192	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.19
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach A		Aluminum	ND	ND	mg/kg		0 / 6	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.22	0.3	mg/kg		6 / 6		0.3	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 6	0.042 / 0.047	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 6	0.027 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 6	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 6	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	123	580	mg/kg		6 / 6		580	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 6	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.16	0.22	mg/kg		6 / 6		0.22	NA	NA			Y	a
		Iron	17.5	17.5	mg/kg		1 / 6	11 / 12.4	17.5	NA	NA			Y	a
		Lead	ND	ND	mg/kg		0 / 6	0.025 / 0.029	ND	NA	NA			N	b
		Magnesium	247	336	mg/kg		6 / 6		336	NA	NA			N	c
		Manganese	0.17	0.22	mg/kg		2 / 6	0.16 / 0.18	0.22	NA	NA			Y	a
		Mercury	0.028	0.13	mg/kg		6 / 6		0.13	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 6	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 6	0.089 / 0.1	ND	NA	NA			N	b
		Potassium	3550	4460	mg/kg		6 / 6		4460	NA	NA			N	c
		Selenium	0.17	0.63	mg/kg		6 / 6		0.63	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 6	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	263	427	mg/kg		6 / 6		427	NA	NA			N	c
		Strontium	0.058	0.47	mg/kg		6 / 6		0.47	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 6	0.013 / 0.038	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 6	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	5.7	12.1	mg/kg		6 / 6		12.1	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.20
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach B		Aluminum	ND	ND	mg/kg		0 / 13	3.6 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 13	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.13	0.3	mg/kg		13 / 13		0.3	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 13	0.042 / 0.048	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 13	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 13	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 13	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	145	493	mg/kg		13 / 13		493	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 13	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	0.016	0.016	mg/kg		2 / 13	0.013 / 0.014	0.016	NA	NA			Y	a
		Copper	0.19	7.3	mg/kg		13 / 13		7.3	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 13	10.9 / 12.5	ND	NA	NA			N	b
		Lead	0.03	0.23	mg/kg		2 / 13	0.025 / 0.029	0.23	NA	NA			Y	a
		Magnesium	267	322	mg/kg		13 / 13		322	NA	NA			N	c
		Manganese	0.16	0.23	mg/kg		6 / 13	0.15 / 0.18	0.23	NA	NA			Y	a
		Mercury	0.047	0.186	mg/kg		13 / 13		0.186	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 13	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.13	0.75	mg/kg		2 / 13	0.088 / 0.1	0.75	NA	NA			Y	a
		Potassium	3730	4420	mg/kg		13 / 13		4420	NA	NA			N	c
		Selenium	0.46	0.88	mg/kg		13 / 13		0.88	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 13	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	378	467	mg/kg		13 / 13		467	NA	NA			N	c
		Strontium	0.066	0.38	mg/kg		13 / 13		0.38	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 13	0.012 / 0.039	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 13	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	5	15.6	mg/kg		13 / 13		15.6	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1260	0.0686	0.152	mg/kg		3 / 3		0.152	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0073	0.0073	mg/kg		1 / 3	0.005 / 0.005	0.0073	NA	NA			Y	a
		4,4'-DDT	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.20
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.1067 / 0.1067	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.08344 / 0.08344	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.05278 / 0.05278	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02957 / 0.02957	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02913 / 0.02913	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.04468 / 0.04468	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04993 / 0.04993	ND	NA	NA			N	b,d
		Potassium-40	3.57	3.57	pCi/g		1 / 1		3.57	NA	NA			Y	a
		Radium-226	0.06154	0.06154	pCi/g		1 / 1		0.06154	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.1067 / 0.1067	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.02781 / 0.02781	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.09724 / 0.09724	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.08234 / 0.08234	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.07096 / 0.07096	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.8366 / 0.8366	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.09658 / 0.09658	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.09373 / 0.09373	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.0876 / 0.0876	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 9	0.003 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.153	0.271	mg/kg		7 / 9	0.14 / 0.189	0.271	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 9	0.0006 / 0.002	ND	NA	NA			N	e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 9	0.003 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.153	0.271	mg/kg		7 / 9	0.14 / 0.189	0.271	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.21
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach B		Aluminum	ND	ND	mg/kg		0 / 18	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 18	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.05	0.15	mg/kg		18 / 18		0.15	NA	NA			N	a, e
		Barium	0.043	0.36	mg/kg		15 / 18	0.041 / 0.045	0.36	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 18	0.026 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 18	0.37 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 18	0.0068 / 0.0079	ND	NA	NA			N	b
		Calcium	88.2	5440	mg/kg		18 / 18		5440	NA	NA			N	c
		Chromium	0.14	0.16	mg/kg		2 / 18	0.11 / 0.13	0.16	NA	NA			Y	a
		Cobalt	0.014	0.021	mg/kg		4 / 18	0.013 / 0.015	0.021	NA	NA			Y	a
		Copper	0.15	0.52	mg/kg		17 / 18	0.13 / 0.14	0.52	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 18	10.8 / 12.5	ND	NA	NA			N	b
		Lead	0.029	0.087	mg/kg		2 / 18	0.025 / 0.029	0.087	NA	NA			Y	a
		Magnesium	226	394	mg/kg		18 / 18		394	NA	NA			N	c
		Manganese	0.22	2.2	mg/kg		14 / 18	0.15 / 0.17	2.2	NA	NA			Y	a
		Mercury	0.03	0.1	mg/kg		18 / 18		0.1	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 18	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.1	0.23	mg/kg		2 / 18	0.088 / 0.1	0.23	NA	NA			Y	a
		Potassium	3120	4120	mg/kg		18 / 18		4120	NA	NA			N	c
		Selenium	0.56	1.2	mg/kg		18 / 18		1.2	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 18	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	285	455	mg/kg		18 / 18		455	NA	NA			N	c
		Strontium	0.048	5.6	mg/kg		18 / 18		5.6	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 18	0.013 / 0.025	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 18	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	8.7	17.2	mg/kg		18 / 18		17.2	NA	NA			Y	a
		Arsenate	ND	ND	mg/kg		0 / 6	0.003 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 6	0.121 / 0.176	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 6	0.0006 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 6	0.003 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 6	0.121 / 0.176	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.22
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach B		Aluminum	ND	ND	mg/kg		0 / 13	3.6 / 4	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 13	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.032	0.1	mg/kg		3 / 13	0.026 / 0.028	0.1	NA	NA			N	a, e
		Barium	0.049	0.21	mg/kg		6 / 13	0.042 / 0.046	0.21	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 13	0.027 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 13	0.38 / 0.42	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 13	0.0069 / 0.0076	ND	NA	NA			N	b
		Calcium	64.5	1590	mg/kg		13 / 13		1590	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 13	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	0.018	0.024	mg/kg		2 / 13	0.013 / 0.014	0.024	NA	NA			Y	a
		Copper	0.25	1.1	mg/kg		13 / 13		1.1	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 13	11 / 12.1	ND	NA	NA			N	b
		Lead	0.031	0.031	mg/kg		1 / 13	0.025 / 0.028	0.031	NA	NA			Y	a
		Magnesium	221	288	mg/kg		13 / 13		288	NA	NA			N	c
		Manganese	0.2	0.97	mg/kg		9 / 13	0.16 / 0.17	0.97	NA	NA			Y	a
		Mercury	0.024	0.15	mg/kg		13 / 13		0.15	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 13	0.032 / 0.035	ND	NA	NA			N	b
		Nickel	0.1	0.1	mg/kg		1 / 13	0.089 / 0.098	0.1	NA	NA			Y	a
		Potassium	3570	4580	mg/kg		13 / 13		4580	NA	NA			N	c
		Selenium	0.24	0.47	mg/kg		13 / 13		0.47	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 13	0.0026 / 0.0029	ND	NA	NA			N	b
		Sodium	292	473	mg/kg		13 / 13		473	NA	NA			N	c
		Strontium	0.05	1.3	mg/kg		13 / 13		1.3	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 13	0.013 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 13	0.042 / 0.046	ND	NA	NA			N	b
		Zinc	5.4	7.9	mg/kg		13 / 13		7.9	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	0.0965	0.0965	mg/kg		1 / 3	0.05 / 0.05	0.0965	NA	NA			Y	a
		PCB-1260	0.126	0.296	mg/kg		3 / 3		0.296	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0056	0.0135	mg/kg		2 / 3	0.005 / 0.005	0.0135	NA	NA			Y	a
		4,4'-DDT	0.0084	0.0084	mg/kg		1 / 3	0.005 / 0.005	0.0084	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0049	0.0049	mg/kg		1 / 3	0.0025 / 0.0025	0.0049	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.22
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.07457 / 0.07457	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.04264 / 0.04264	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.03935 / 0.03935	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.01938 / 0.01938	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02678 / 0.02678	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.02946 / 0.02946	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.03708 / 0.03708	ND	NA	NA			N	b,d
		Potassium-40	2.884	2.884	pCi/g		1 / 1		2.884	NA	NA			Y	a
		Radium-226	0.09043	0.09043	pCi/g		1 / 1		0.09043	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.07457 / 0.07457	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.01677 / 0.01677	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.08899 / 0.08899	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.0754 / 0.0754	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.0651 / 0.0651	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.3584 / 0.3584	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.04573 / 0.04573	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.05644 / 0.05644	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.04573 / 0.04573	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.003 / 0.006	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 8	0.125 / 0.19	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0005 / 0.004	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.003 / 0.006	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 8	0.125 / 0.19	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.23
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach B		Aluminum	ND	ND	mg/kg		0 / 6	3.9 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 6	0.014 / 0.015	ND	NA	NA			N	b
		Arsenic	0.12	0.23	mg/kg		6 / 6		0.23	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 6	0.045 / 0.048	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 6	0.029 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 6	0.4 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 6	0.0074 / 0.0079	ND	NA	NA			N	b
		Calcium	98.2	400	mg/kg		6 / 6		400	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 6	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 6	0.014 / 0.015	ND	NA	NA			N	b
		Copper	0.15	2.7	mg/kg		5 / 6	0.14 / 0.15	2.7	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 6	11.7 / 12.5	ND	NA	NA			N	b
		Lead	0.044	0.098	mg/kg		2 / 6	0.027 / 0.029	0.098	NA	NA			Y	a
		Magnesium	265	277	mg/kg		6 / 6		277	NA	NA			N	c
		Manganese	ND	ND	mg/kg		0 / 6	0.17 / 0.18	ND	NA	NA			N	b
		Mercury	0.063	0.16	mg/kg		6 / 6		0.16	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 6	0.034 / 0.036	ND	NA	NA			N	b
		Nickel	0.2	0.51	mg/kg		2 / 6	0.095 / 0.1	0.51	NA	NA			Y	a
		Potassium	3620	4000	mg/kg		6 / 6		4000	NA	NA			N	c
		Selenium	0.53	0.69	mg/kg		6 / 6		0.69	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 6	0.0028 / 0.003	ND	NA	NA			N	b
		Sodium	264	389	mg/kg		6 / 6		389	NA	NA			N	c
		Strontium	0.049	0.34	mg/kg		6 / 6		0.34	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 6	0.013 / 0.025	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 6	0.044 / 0.047	ND	NA	NA			N	b
		Zinc	6.1	9.5	mg/kg		6 / 6		9.5	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.24
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach C		Aluminum	ND	ND	mg/kg		0 / 12	3.6 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.11	0.41	mg/kg		12 / 12		0.41	NA	NA			N	a, e
		Barium	0.049	0.26	mg/kg		6 / 12	0.042 / 0.048	0.26	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 12	0.028 / 0.061	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	152	6660	mg/kg		12 / 12		6660	NA	NA			N	c
		Chromium	0.14	0.14	mg/kg		1 / 12	0.12 / 0.13	0.14	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.2	4.2	mg/kg		12 / 12		4.2	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.9 / 12.5	ND	NA	NA			N	b
		Lead	0.039	0.041	mg/kg		2 / 12	0.025 / 0.029	0.041	NA	NA			Y	a
		Magnesium	265	393	mg/kg		12 / 12		393	NA	NA			N	c
		Manganese	0.17	0.95	mg/kg		8 / 12	0.15 / 0.18	0.95	NA	NA			Y	a
		Mercury	0.041	0.28	mg/kg		12 / 12		0.28	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.32	mg/kg		2 / 12	0.089 / 0.1	0.32	NA	NA			Y	a
		Potassium	3470	3920	mg/kg		12 / 12		3920	NA	NA			N	c
		Selenium	0.37	0.76	mg/kg		12 / 12		0.76	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	321	461	mg/kg		12 / 12		461	NA	NA			N	c
		Strontium	0.075	5.1	mg/kg		12 / 12		5.1	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.013 / 0.016	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.042 / 0.16	ND	NA	NA			N	b
		Zinc	5.8	15.4	mg/kg		12 / 12		15.4	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1254	0.213	0.213	mg/kg		1 / 2	0.05 / 0.05	0.213	NA	NA			Y	a
		PCB-1260	0.0739	0.497	mg/kg		2 / 2		0.497	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0278	0.0278	mg/kg		1 / 2	0.005 / 0.005	0.0278	NA	NA			Y	a
		4,4'-DDT	0.0134	0.0134	mg/kg		1 / 2	0.005 / 0.005	0.0134	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0094	0.0094	mg/kg		1 / 2	0.0025 / 0.0025	0.0094	NA	NA			Y	a

TABLE 2.24
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		beta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	0.004	0.004	mg/kg		1 / 2	0.0025 / 0.0025	0.004	NA	NA			Y	a
		Methoxychlor	ND	ND	mg/kg		0 / 2	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 2	0.075 / 0.075	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.179	0.179	mg/kg		1 / 2	0.142 / 0.142	0.179	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 2	0.001 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.179	0.179	mg/kg		1 / 2	0.142 / 0.142	0.179	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.25
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach C		Aluminum	4.5	7.3	mg/kg		4 / 11	3.6 / 4.1	7.3	NA	NA			Y	a
		Antimony	ND	ND	mg/kg		0 / 11	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.033	0.11	mg/kg		9 / 11	0.025 / 0.027	0.11	NA	NA			N	a, e
		Barium	0.052	0.3	mg/kg		11 / 11		0.3	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 11	0.028 / 0.061	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 11	0.38 / 0.42	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 11	0.0069 / 0.0078	ND	NA	NA			N	b
		Calcium	139	3620	mg/kg		11 / 11		3620	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 11	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	0.015	0.028	mg/kg		5 / 11	0.013 / 0.014	0.028	NA	NA			Y	a
		Copper	0.18	0.38	mg/kg		11 / 11		0.38	NA	NA			Y	a
		Iron	12.6	12.6	mg/kg		1 / 11	10.9 / 12.3	12.6	NA	NA			Y	a
		Lead	ND	ND	mg/kg		0 / 11	0.025 / 0.34	ND	NA	NA			N	b
		Magnesium	251	334	mg/kg		11 / 11		334	NA	NA			N	c
		Manganese	0.53	4.2	mg/kg		11 / 11		4.2	NA	NA			Y	a
		Mercury	0.027	0.066	mg/kg		11 / 11		0.066	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 11	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 11	0.089 / 0.1	ND	NA	NA			N	b
		Potassium	2560	3570	mg/kg		11 / 11		3570	NA	NA			N	c
		Selenium	0.43	0.69	mg/kg		11 / 11		0.69	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 11	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	356	520	mg/kg		11 / 11		520	NA	NA			N	c
		Strontium	0.14	3.3	mg/kg		11 / 11		3.3	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 11	0.013 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 11	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	9	18.3	mg/kg		11 / 11		18.3	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.26
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reach C		Aluminum	ND	ND	mg/kg		0 / 12	3.5 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.078	0.078	mg/kg		1 / 12	0.025 / 0.029	0.078	NA	NA			N	a, e
		Barium	0.043	0.6	mg/kg		10 / 12	0.041 / 0.046	0.6	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 12	0.026 / 0.061	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.37 / 0.42	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0068 / 0.0078	ND	NA	NA			N	b
		Calcium	134	3450	mg/kg		12 / 12		3450	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 12	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	0.019	0.035	mg/kg		3 / 12	0.012 / 0.014	0.035	NA	NA			Y	a
		Copper	0.21	1.8	mg/kg		12 / 12		1.8	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.7 / 12.3	ND	NA	NA			N	b
		Lead	0.029	0.07	mg/kg		2 / 12	0.025 / 0.028	0.07	NA	NA			Y	a
		Magnesium	220	275	mg/kg		12 / 12		275	NA	NA			N	c
		Manganese	0.19	4.5	mg/kg		12 / 12		4.5	NA	NA			Y	a
		Mercury	0.03	0.26	mg/kg		12 / 12		0.26	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.56	mg/kg		4 / 12	0.087 / 0.1	0.56	NA	NA			Y	a
		Potassium	3590	4200	mg/kg		12 / 12		4200	NA	NA			N	c
		Selenium	0.17	0.33	mg/kg		12 / 12		0.33	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	350	567	mg/kg		12 / 12		567	NA	NA			N	c
		Strontium	0.13	3.1	mg/kg		12 / 12		3.1	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.012 / 0.041	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	6.1	12.8	mg/kg		12 / 12		12.8	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 2	0.05 / 0.2	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 2	0.05 / 0.2	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 2	0.05 / 0.2	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 2	0.05 / 0.2	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 2	0.05 / 0.2	ND	NA	NA			N	b
		PCB-1254	ND	ND	mg/kg		0 / 2	0.05 / 0.2	ND	NA	NA			N	b
		PCB-1260	0.126	1.12	mg/kg		2 / 2		1.12	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0061	0.0168	mg/kg		2 / 2		0.0168	NA	NA			Y	a
		4,4'-DDT	0.0202	0.0202	mg/kg		1 / 2	0.005 / 0.005	0.0202	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0031	0.0031	mg/kg		1 / 2	0.0025 / 0.0025	0.0031	NA	NA			Y	a

TABLE 2.26
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		beta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 2	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 2	0.075 / 0.075	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 2	0.17 / 0.183	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 2	0.0008 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 2	0.17 / 0.183	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.27
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 12	3.5 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.072	0.21	mg/kg		12 / 12		0.21	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 12	0.04 / 0.048	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 12	0.026 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.36 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0066 / 0.0079	ND	NA	NA			N	b
		Calcium	110	665	mg/kg		12 / 12		665	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 12	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 12	0.012 / 0.015	ND	NA	NA			N	b
		Copper	0.18	0.59	mg/kg		12 / 12		0.59	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.5 / 12.5	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 12	0.024 / 0.029	ND	NA	NA			N	b
		Magnesium	255	322	mg/kg		12 / 12		322	NA	NA			N	c
		Manganese	0.21	0.21	mg/kg		1 / 12	0.15 / 0.18	0.21	NA	NA			Y	a
		Mercury	0.111	0.212	mg/kg		12 / 12		0.212	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 12	0.085 / 0.1	ND	NA	NA			N	b
		Potassium	3590	4340	mg/kg		12 / 12		4340	NA	NA			N	c
		Selenium	0.35	0.66	mg/kg		12 / 12		0.66	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0025 / 0.003	ND	NA	NA			N	b
		Sodium	306	444	mg/kg		12 / 12		444	NA	NA			N	c
		Strontium	0.042	0.46	mg/kg		12 / 12		0.46	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.012 / 0.016	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.04 / 0.047	ND	NA	NA			N	b
		Zinc	6.3	14.9	mg/kg		12 / 12		14.9	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1260	0.061	0.105	mg/kg		3 / 3		0.105	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDT	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.27
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.09787 / 0.09787	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.08615 / 0.08615	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.0562 / 0.0562	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02116 / 0.02116	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.03103 / 0.03103	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.03472 / 0.03472	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04796 / 0.04796	ND	NA	NA			N	b,d
		Potassium-40	3.407	3.407	pCi/g		1 / 1		3.407	NA	NA			Y	a
		Radium-226	0.09743	0.09743	pCi/g		1 / 1		0.09743	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.09787 / 0.09787	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.02365 / 0.02365	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.08246 / 0.08246	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.08116 / 0.08116	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.06987 / 0.06987	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.6727 / 0.6727	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.04275 / 0.04275	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.05295 / 0.05295	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.07899 / 0.07899	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.003 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.152	0.208	mg/kg		3 / 8	0.104 / 0.191	0.208	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0004 / 0.0008	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.003 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.152	0.208	mg/kg		3 / 8	0.104 / 0.191	0.208	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.28
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reference Reach		Aluminum	5.8	5.8	mg/kg		1 / 18	3.6 / 57.6	5.8	NA	NA			Y	a
		Antimony	ND	ND	mg/kg		0 / 18	0.013 / 0.21	ND	NA	NA			N	b
		Arsenic	0.04	0.093	mg/kg		8 / 18	0.025 / 0.4	0.093	NA	NA			Y	a
		Barium	0.065	0.48	mg/kg		4 / 18	0.042 / 0.66	0.48	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 18	0.027 / 0.42	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 18	0.38 / 6	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 18	0.0069 / 0.11	ND	NA	NA			N	b
		Calcium	85.4	3400	mg/kg		15 / 18	43.6 / 694	3400	NA	NA			N	c
		Chromium	0.13	0.67	mg/kg		2 / 18	0.11 / 1.8	0.67	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 18	0.013 / 0.2	ND	NA	NA			N	b
		Copper	0.17	0.46	mg/kg		15 / 18	0.13 / 2.1	0.46	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 18	10.9 / 174	ND	NA	NA			N	b
		Lead	0.51	0.51	mg/kg		1 / 18	0.025 / 0.24	0.51	NA	NA			Y	b
		Magnesium	252	349	mg/kg		16 / 18	43.6 / 694	349	NA	NA			N	c
		Manganese	0.21	7.1	mg/kg		13 / 18	0.15 / 2.5	7.1	NA	NA			Y	a
		Mercury	0.031	0.12	mg/kg		16 / 18	0.01 / 0.17	0.12	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 18	0.032 / 0.51	ND	NA	NA			N	b
		Nickel	0.098	0.35	mg/kg		2 / 18	0.088 / 1.4	0.35	NA	NA			Y	b
		Potassium	2610	3980	mg/kg		16 / 18	654 / 10400	3980	NA	NA			N	c
		Selenium	0.38	1	mg/kg		16 / 18	0.061 / 0.98	1	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 18	0.0026 / 0.042	ND	NA	NA			N	b
		Sodium	269	823	mg/kg		16 / 18	43.6 / 694	823	NA	NA			N	c
		Strontium	0.097	2.8	mg/kg		14 / 18	0.04 / 0.63	2.8	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 18	0.012 / 0.2	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 18	0.041 / 0.66	ND	NA	NA			N	b
		Zinc	8.2	19.2	mg/kg		16 / 18	2 / 31.3	19.2	NA	NA			Y	a
		Arsenate	ND	ND	mg/kg		0 / 6	0.003 / 0.007	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 6	0.131 / 0.173	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 6	0.0006 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 6	0.003 / 0.007	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 6	0.131 / 0.173	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.29
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 14	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 14	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	ND	ND	mg/kg		0 / 14	0.025 / 0.029	ND	NA	NA			N	b
		Barium	0.07	0.13	mg/kg		6 / 14	0.042 / 0.046	0.13	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 14	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 14	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 14	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	65.6	1160	mg/kg		14 / 14		1160	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 14	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 14	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.19	0.49	mg/kg		14 / 14		0.49	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 14	10.9 / 12.5	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 14	0.025 / 0.029	ND	NA	NA			N	b
		Magnesium	200	275	mg/kg		14 / 14		275	NA	NA			N	c
		Manganese	0.23	0.95	mg/kg		8 / 14	0.15 / 0.17	0.95	NA	NA			Y	a
		Mercury	0.042	0.24	mg/kg		14 / 14		0.24	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 14	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.2	mg/kg		4 / 14	0.088 / 0.1	0.2	NA	NA			Y	a
		Potassium	3450	4350	mg/kg		14 / 14		4350	NA	NA			N	c
		Selenium	0.16	0.4	mg/kg		14 / 14		0.4	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 14	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	341	591	mg/kg		14 / 14		591	NA	NA			N	c
		Strontium	0.054	1.1	mg/kg		14 / 14		1.1	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 14	0.012 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 14	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	5	12.1	mg/kg		14 / 14		12.1	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1254	0.0649	0.141	mg/kg		3 / 3		0.141	NA	NA			Y	a
		PCB-1260	0.176	0.494	mg/kg		3 / 3		0.494	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0088	0.0206	mg/kg		3 / 3		0.0206	NA	NA			Y	a
		4,4'-DDT	0.0089	0.0107	mg/kg		2 / 3	0.005 / 0.005	0.0107	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0026	0.0092	mg/kg		3 / 3		0.0092	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.29
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	0.0063	0.0063	mg/kg		1 / 3	0.0025 / 0.0025	0.0063	NA	NA			Y	a
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.08549 / 0.08549	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.1004 / 0.1004	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.05444 / 0.05444	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02256 / 0.02256	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02836 / 0.02836	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.03519 / 0.03519	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04761 / 0.04761	ND	NA	NA			N	b,d
		Potassium-40	3.457	3.457	pCi/g		1 / 1		3.457	NA	NA			Y	a
		Radium-226	ND	ND	pCi/g		0 / 1	0.04078 / 0.04078	ND	NA	NA			N	b
		Radium-228	ND	ND	pCi/g		0 / 1	0.08549 / 0.08549	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.02546 / 0.02546	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.09998 / 0.09998	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.08508 / 0.08508	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.09356 / 0.09356	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.8942 / 0.8942	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.09812 / 0.09812	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.05196 / 0.05196	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.09232 / 0.09232	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 8	0.131 / 0.194	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0004 / 0.0008	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 8	0.131 / 0.194	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.30
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Emory River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 3	4 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 3	0.014 / 0.015	ND	NA	NA			N	b
		Arsenic	0.11	0.15	mg/kg		3 / 3		0.15	NA	NA			N	a, e
		Barium	0.12	0.12	mg/kg		1 / 3	0.046 / 0.046	0.12	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 3	0.03 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 3	0.41 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 3	0.0076 / 0.0079	ND	NA	NA			N	b
		Calcium	161	2840	mg/kg		3 / 3		2840	NA	NA			N	c
		Chromium	0.15	0.15	mg/kg		1 / 3	0.13 / 0.13	0.15	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 3	0.014 / 0.015	ND	NA	NA			N	b
		Copper	0.15	0.25	mg/kg		3 / 3		0.25	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 3	12.1 / 12.5	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 3	0.028 / 0.029	ND	NA	NA			N	b
		Magnesium	260	318	mg/kg		3 / 3		318	NA	NA			N	c
		Manganese	0.47	0.47	mg/kg		1 / 3	0.17 / 0.17	0.47	NA	NA			Y	a
		Mercury	0.052	0.061	mg/kg		3 / 3		0.061	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 3	0.035 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 3	0.098 / 0.1	ND	NA	NA			N	b
		Potassium	3760	4040	mg/kg		3 / 3		4040	NA	NA			N	c
		Selenium	0.34	0.37	mg/kg		3 / 3		0.37	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 3	0.0029 / 0.003	ND	NA	NA			N	b
		Sodium	200	296	mg/kg		3 / 3		296	NA	NA			N	c
		Strontium	0.1	1.7	mg/kg		3 / 3		1.7	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 3	0.014 / 0.019	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 3	0.046 / 0.047	ND	NA	NA			N	b
		Zinc	6.3	20	mg/kg		3 / 3		20	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.31
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Little Emory River		Aluminum	ND	ND	mg/kg		0 / 12	3.6 / 7.9	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.034	0.16	mg/kg		12 / 12		0.16	NA	NA			N	a, e
		Barium	0.046	0.057	mg/kg		3 / 12	0.041 / 0.048	0.057	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 12	0.027 / 0.058	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.37 / 0.82	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	93.8	879	mg/kg		12 / 12		879	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 12	0.11 / 0.25	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 12	0.0129 / 0.028	ND	NA	NA			N	b
		Copper	0.19	1.8	mg/kg		12 / 12		1.8	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.9 / 23.9	ND	NA	NA			N	b
		Lead	0.029	0.093	mg/kg		2 / 12	0.025 / 0.029	0.093	NA	NA			Y	a
		Magnesium	255	312	mg/kg		12 / 12		312	NA	NA			N	c
		Manganese	0.17	0.43	mg/kg		5 / 12	0.15 / 0.34	0.43	NA	NA			Y	a
		Mercury	0.064	0.24	mg/kg		12 / 12		0.24	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.22	0.59	mg/kg		2 / 12	0.088 / 0.19	0.59	NA	NA			Y	a
		Potassium	3700	4420	mg/kg		12 / 12		4420	NA	NA			N	c
		Selenium	0.4	0.56	mg/kg		12 / 12		0.56	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	333	457	mg/kg		12 / 12		457	NA	NA			N	c
		Strontium	0.044	0.67	mg/kg		11 / 12	0.04 / 0.0419	0.67	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.012 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.041 / 0.18	ND	NA	NA			N	b
		Zinc	4.1	11.1	mg/kg		12 / 12		11.1	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.32
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Little Emory River		Aluminum	4.1	4.1	mg/kg		1 / 18	3.6 / 4.1	4.1	NA	NA			Y	a
		Antimony	ND	ND	mg/kg		0 / 18	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.029	0.11	mg/kg		12 / 18	0.025 / 0.0281	0.11	NA	NA			N	a, e
		Barium	0.067	0.13	mg/kg		5 / 18	0.041 / 0.32	0.13	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 18	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 18	0.37 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 18	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	100	1960	mg/kg		18 / 18		1960	NA	NA			N	c
		Chromium	0.15	0.15	mg/kg		1 / 18	0.11 / 0.13	0.15	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 18	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.18	0.35	mg/kg		17 / 18	0.13 / 0.147	0.35	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 18	10.9 / 12.5	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 18	0.025 / 0.029	ND	NA	NA			N	b
		Magnesium	228	307	mg/kg		18 / 18		307	NA	NA			N	c
		Manganese	0.17	2.6	mg/kg		18 / 18		2.6	NA	NA			Y	a
		Mercury	0.022	0.067	mg/kg		18 / 18		0.067	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 18	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 18	0.088 / 0.1	ND	NA	NA			N	b
		Potassium	3140	4140	mg/kg		18 / 18		4140	NA	NA			N	c
		Selenium	0.38	0.68	mg/kg		18 / 18		0.68	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 18	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	264	524	mg/kg		18 / 18		524	NA	NA			N	c
		Strontium	0.073	2	mg/kg		18 / 18		2	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 18	0.012 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 18	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	7.6	21	mg/kg		18 / 18		21	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.33
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Little Emory River		Aluminum	ND	ND	mg/kg		0 / 6	3.7 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	ND	ND	mg/kg		0 / 6	0.026 / 0.029	ND	NA	NA			N	b
		Barium	ND	ND	mg/kg		0 / 6	0.042 / 0.048	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 6	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 6	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 6	0.007 / 0.0079	ND	NA	NA			N	b
		Calcium	78	104	mg/kg		6 / 6		104	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 6	0.119 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.14	1	mg/kg		6 / 6		1	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 6	11 / 12.5	ND	NA	NA			N	b
		Lead	0.043	0.043	mg/kg		1 / 6	0.025 / 0.029	0.043	NA	NA			Y	a
		Magnesium	248	307	mg/kg		6 / 6		307	NA	NA			N	c
		Manganese	0.17	0.23	mg/kg		3 / 6	0.16 / 0.17	0.23	NA	NA			Y	a
		Mercury	0.038	0.16	mg/kg		6 / 6		0.16	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 6	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 6	0.089 / 0.1	ND	NA	NA			N	b
		Potassium	4010	4710	mg/kg		6 / 6		4710	NA	NA			N	c
		Selenium	0.26	0.32	mg/kg		6 / 6		0.32	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 6	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	341	428	mg/kg		6 / 6		428	NA	NA			N	c
		Strontium	0.051	0.083	mg/kg		6 / 6		0.083	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 6	0.0129 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 6	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	4.5	8	mg/kg		6 / 6		8	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.34
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Little Emory River		Aluminum	ND	ND	mg/kg		0 / 6	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.098	0.18	mg/kg		6 / 6		0.18	NA	NA			N	a, e
		Barium	0.054	0.12	mg/kg		2 / 6	0.041 / 0.046	0.12	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 6	0.026 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 6	0.37 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 6	0.0068 / 0.0078	ND	NA	NA			N	b
		Calcium	141	646	mg/kg		6 / 6		646	NA	NA			N	c
		Chromium	0.17	0.23	mg/kg		2 / 6	0.11 / 0.13	0.23	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 6	0.013 / 0.014	ND	NA	NA			N	b
		Copper	0.16	0.18	mg/kg		4 / 6	0.13 / 0.15	0.18	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 6	10.8 / 12.4	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 6	0.025 / 0.029	ND	NA	NA			N	b
		Magnesium	260	300	mg/kg		6 / 6		300	NA	NA			N	c
		Manganese	0.2	0.23	mg/kg		2 / 6	0.15 / 0.18	0.23	NA	NA			Y	a
		Mercury	0.04	0.11	mg/kg		6 / 6		0.11	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 6	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	0.13	0.16	mg/kg		3 / 6	0.087 / 0.098	0.16	NA	NA			Y	b
		Potassium	3600	4100	mg/kg		6 / 6		4100	NA	NA			N	c
		Selenium	0.42	0.49	mg/kg		6 / 6		0.49	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 6	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	252	294	mg/kg		6 / 6		294	NA	NA			N	c
		Strontium	0.067	0.44	mg/kg		6 / 6		0.44	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 6	0.012 / 0.018	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 6	0.041 / 0.047	ND	NA	NA			N	b
		Zinc	4.3	7.7	mg/kg		6 / 6		7.7	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.35
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach A		Aluminum	ND	ND	mg/kg		0 / 12	3.5 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.059	0.33	mg/kg		12 / 12		0.33	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 12	0.041 / 0.048	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 12	0.026 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.37 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0067 / 0.0079	ND	NA	NA			N	b
		Calcium	157	754	mg/kg		12 / 12		754	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 12	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 12	0.012 / 0.015	ND	NA	NA			N	b
		Copper	0.19	0.57	mg/kg		12 / 12		0.57	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.6 / 12.5	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 12	0.025 / 0.029	ND	NA	NA			N	b
		Magnesium	259	326	mg/kg		12 / 12		326	NA	NA			N	c
		Manganese	0.17	0.28	mg/kg		9 / 12	0.15 / 0.17	0.28	NA	NA			Y	a
		Mercury	0.0421	0.395	mg/kg		12 / 12		0.395	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	0.1	0.13	mg/kg		3 / 12	0.086 / 0.1	0.13	NA	NA			Y	a
		Potassium	3500	4180	mg/kg		12 / 12		4180	NA	NA			N	c
		Selenium	0.39	1	mg/kg		12 / 12		1	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	340	553	mg/kg		12 / 12		553	NA	NA			N	c
		Strontium	0.086	0.6	mg/kg		12 / 12		0.6	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.012 / 0.015	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.04 / 0.047	ND	NA	NA			N	b
		Zinc	5.6	17.5	mg/kg		12 / 12		17.5	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	0.06	0.0833	mg/kg		2 / 3	0.05 / 0.05	0.0833	NA	NA			Y	a
		PCB-1260	0.0669	0.234	mg/kg		3 / 3		0.234	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0078	0.018	mg/kg		2 / 3	0.005 / 0.005	0.018	NA	NA			Y	a
		4,4'-DDT	0.005	0.005	mg/kg		1 / 3	0.005 / 0.005	0.005	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.35
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.08259 / 0.08259	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.08963 / 0.08963	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.04264 / 0.04264	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.01998 / 0.01998	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02132 / 0.02132	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.03126 / 0.03126	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04037 / 0.04037	ND	NA	NA			N	b,d
		Potassium-40	3.188	3.188	pCi/g		1 / 1		3.188	NA	NA			Y	a
		Radium-226	0.05444	0.05444	pCi/g		1 / 1		0.05444	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.08259 / 0.08259	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.01846 / 0.01846	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.09853 / 0.09853	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.0828 / 0.0828	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.08259 / 0.08259	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.7473 / 0.7473	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.07721 / 0.07721	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.05175 / 0.05175	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.06686 / 0.06686	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.195	0.299	mg/kg		3 / 8	0.149 / 0.168	0.299	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0006 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.195	0.299	mg/kg		3 / 8	0.149 / 0.168	0.299	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.36
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach A		Aluminum	ND	ND	mg/kg		0 / 18	3.6 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 18	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.033	0.32	mg/kg		18 / 18		0.32	NA	NA			N	a, e
		Barium	0.05	0.24	mg/kg		9 / 18	0.042 / 0.048	0.24	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 18	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 18	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 18	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	110	2750	mg/kg		18 / 18		2750	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 18	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	0.015	0.015	mg/kg		1 / 18	0.013 / 0.015	0.015	NA	NA			Y	a
		Copper	0.16	0.43	mg/kg		17 / 18	0.13 / 0.15	0.43	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 18	11 / 12.5	ND	NA	NA			N	b
		Lead	0.065	0.065	mg/kg		1 / 18	0.025 / 0.029	0.065	NA	NA			Y	a
		Magnesium	218	341	mg/kg		18 / 18		341	NA	NA			N	c
		Manganese	0.19	1.6	mg/kg		12 / 18	0.16 / 0.18	1.6	NA	NA			Y	a
		Mercury	0.037	0.1	mg/kg		18 / 18		0.1	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 18	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 18	0.089 / 0.1	ND	NA	NA			N	b
		Potassium	3180	3930	mg/kg		18 / 18		3930	NA	NA			N	c
		Selenium	0.48	1.5	mg/kg		18 / 18		1.5	NA	NA			Y	a
		Silver	0.0046	0.0046	mg/kg		1 / 18	0.0026 / 0.003	0.0046	NA	NA			Y	a
		Sodium	283	624	mg/kg		18 / 18		624	NA	NA			N	c
		Strontium	0.07	2.7	mg/kg		18 / 18		2.7	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 18	0.013 / 0.03	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 18	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	8.7	23.9	mg/kg		18 / 18		23.9	NA	NA			Y	a
		Arsenate	ND	ND	mg/kg		0 / 6	0.003 / 0.005	ND	NA	NA			N	b.e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 6	0.121 / 0.184	ND	NA	NA			N	b.e
		Arsenite	ND	ND	mg/kg		0 / 6	0.0008 / 0.002	ND	NA	NA			N	b.e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 6	0.003 / 0.005	ND	NA	NA			N	b.e
		Organic Arsenic	ND	ND	mg/kg		0 / 6	0.121 / 0.184	ND	NA	NA			N	b.e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.37
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach A		Aluminum	ND	ND	mg/kg		0 / 12	3.6 / 4.15	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.028	0.12	mg/kg		6 / 12	0.025 / 0.029	0.12	NA	NA			N	a, e
		Barium	0.042	0.072	mg/kg		4 / 12	0.0419 / 0.0476	0.072	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 12	0.0269 / 0.0306	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.378 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	66.9	920	mg/kg		12 / 12		920	NA	NA			N	c
		Chromium	0.2	0.2	mg/kg		1 / 12	0.116 / 0.132	0.2	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 12	0.0129 / 0.015	ND	NA	NA			N	b
		Copper	0.21	7.1	mg/kg		12 / 12		7.1	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 12	10.9 / 12.5	ND	NA	NA			N	b
		Lead	0.11	0.31	mg/kg		2 / 12	0.025 / 0.029	0.31	NA	NA			Y	a
		Magnesium	218	260	mg/kg		12 / 12		260	NA	NA			N	c
		Manganese	0.16	0.61	mg/kg		8 / 12	0.15 / 0.177	0.61	NA	NA			Y	a
		Mercury	0.042	0.15	mg/kg		12 / 12		0.15	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.032 / 0.0365	ND	NA	NA			N	b
		Nickel	0.14	0.47	mg/kg		4 / 12	0.089 / 0.101	0.47	NA	NA			Y	b
		Potassium	3350	4530	mg/kg		12 / 12		4530	NA	NA			N	c
		Selenium	0.25	0.48	mg/kg		12 / 12		0.48	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	339	465	mg/kg		12 / 12		465	NA	NA			N	c
		Strontium	0.054	0.73	mg/kg		12 / 12		0.73	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.012 / 0.0143	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.041 / 0.0474	ND	NA	NA			N	b
		Zinc	5.3	12.1	mg/kg		12 / 12		12.1	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	0.0917	0.109	mg/kg		3 / 3		0.109	NA	NA			Y	a
		PCB-1260	0.188	0.227	mg/kg		3 / 3		0.227	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0097	0.0144	mg/kg		3 / 3		0.0144	NA	NA			Y	a
		4,4'-DDT	0.0057	0.0064	mg/kg		3 / 3		0.0064	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0073	0.0089	mg/kg		2 / 3	0.0025 / 0.0025	0.0089	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.37
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	0.0027	0.0031	mg/kg		2 / 3	0.0025 / 0.0025	0.0031	NA	NA			Y	a
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.0841 / 0.0841	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.08774 / 0.08774	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.04723 / 0.04723	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02074 / 0.02074	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02112 / 0.02112	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.03187 / 0.03187	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04339 / 0.04339	ND	NA	NA			N	b,d
		Potassium-40	3.494	3.494	pCi/g		1 / 1		3.494	NA	NA			Y	a
		Radium-226	0.06182	0.06182	pCi/g		1 / 1		0.06182	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.0841 / 0.0841	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.01907 / 0.01907	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.09235 / 0.09235	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.07757 / 0.07757	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.04186 / 0.04186	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.8006 / 0.8006	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.07834 / 0.07834	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.08141 / 0.08141	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.06586 / 0.06586	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.001 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 8	0.118 / 0.191	ND	NA	NA			N	b,e
		Arsenite	0.001	0.002	mg/kg		3 / 8	0.0003 / 0.001	0.002	NA	NA			Y	e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.001 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 8	0.118 / 0.191	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.38
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach A		Aluminum	ND	ND	mg/kg		0 / 6	3.5 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.25	0.3	mg/kg		6 / 6		0.3	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 6	0.04 / 0.047	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 6	0.026 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 6	0.36 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 6	0.0066 / 0.0078	ND	NA	NA			N	b
		Calcium	126	286	mg/kg		6 / 6		286	NA	NA			N	c
		Chromium	0.12	0.12	mg/kg		1 / 6	0.11 / 0.13	0.12	NA	NA			Y	a
		Cobalt	ND	ND	mg/kg		0 / 6	0.012 / 0.014	ND	NA	NA			N	b
		Copper	0.21	0.44	mg/kg		6 / 6		0.44	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 6	10.5 / 12.4	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 6	0.024 / 0.029	ND	NA	NA			N	b
		Magnesium	259	315	mg/kg		6 / 6		315	NA	NA			N	c
		Manganese	0.21	0.21	mg/kg		1 / 6	0.15 / 0.16	0.21	NA	NA			Y	a
		Mercury	0.014	0.055	mg/kg		6 / 6		0.055	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 6	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.11	mg/kg		1 / 6	0.085 / 0.1	0.11	NA	NA			Y	a
		Potassium	3710	4350	mg/kg		6 / 6		4350	NA	NA			N	c
		Selenium	0.24	0.32	mg/kg		6 / 6		0.32	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 6	0.0025 / 0.003	ND	NA	NA			N	b
		Sodium	297	402	mg/kg		6 / 6		402	NA	NA			N	c
		Strontium	0.05	0.17	mg/kg		6 / 6		0.17	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 6	0.012 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 6	0.04 / 0.047	ND	NA	NA			N	b
		Zinc	5.6	8.9	mg/kg		6 / 6		8.9	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.39
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach B		Aluminum	ND	ND	mg/kg		0 / 12	3.6 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 12	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.17	0.33	mg/kg		12 / 12		0.33	NA	NA			N	a, e
		Barium	0.1	0.58	mg/kg		3 / 12	0.042 / 0.048	0.58	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 12	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 12	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 12	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	234	21400	mg/kg		12 / 12		21400	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 12	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	0.018	0.018	mg/kg		1 / 12	0.013 / 0.015	0.018	NA	NA			Y	a
		Copper	0.2	9.7	mg/kg		12 / 12		9.7	NA	NA			Y	a
		Iron	17.6	17.6	mg/kg		1 / 12	10.9 / 12.5	17.6	NA	NA			Y	a
		Lead	0.21	0.21	mg/kg		1 / 12	0.025 / 0.029	0.21	NA	NA			Y	a
		Magnesium	288	550	mg/kg		12 / 12		550	NA	NA			N	c
		Manganese	0.19	2.7	mg/kg		7 / 12	0.15 / 0.18	2.7	NA	NA			Y	a
		Mercury	0.039	0.14	mg/kg		12 / 12		0.14	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 12	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.16	0.51	mg/kg		2 / 12	0.089 / 0.099	0.51	NA	NA			Y	a
		Potassium	2420	3680	mg/kg		12 / 12		3680	NA	NA			N	c
		Selenium	0.47	0.91	mg/kg		12 / 12		0.91	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 12	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	351	1650	mg/kg		12 / 12		1650	NA	NA			N	c
		Strontium	0.12	15.8	mg/kg		12 / 12		15.8	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 12	0.013 / 0.017	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 12	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	6.3	17.8	mg/kg		12 / 12		17.8	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 2	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1254	0.127	0.127	mg/kg		1 / 2	0.05 / 0.05	0.127	NA	NA			Y	a
		PCB-1260	0.0903	0.383	mg/kg		2 / 2		0.383	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0217	0.0217	mg/kg		1 / 2	0.005 / 0.005	0.0217	NA	NA			Y	a
		4,4'-DDT	0.0131	0.0131	mg/kg		1 / 2	0.005 / 0.005	0.0131	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0056	0.0056	mg/kg		1 / 2	0.0025 / 0.0025	0.0056	NA	NA			Y	a

TABLE 2.39
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		beta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	0.0034	0.0034	mg/kg		1 / 2	0.0025 / 0.0025	0.0034	NA	NA			Y	b
		Methoxychlor	ND	ND	mg/kg		0 / 2	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 2	0.075 / 0.075	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 2	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.198	0.245	mg/kg		2 / 2		0.245	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 2	0.0007 / 0.003	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 2	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.198	0.245	mg/kg		2 / 2		0.245	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.40
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach B		Aluminum	ND	ND	mg/kg		0 / 7	3.7 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 13	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.086	0.29	mg/kg		11 / 13	0.024 / 0.14	0.29	NA	NA			N	a, e
		Barium	0.055	0.68	mg/kg		11 / 12	0.04 / 0.043	0.68	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 13	0.026 / 0.0617	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 13	0.36 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 13	0.0066 / 0.0159	ND	NA	NA			N	b
		Calcium	201	15100	mg/kg		13 / 13		15100	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 13	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 13	0.012 / 0.015	ND	NA	NA			N	b
		Copper	0.16	0.31	mg/kg		12 / 13	0.13 / 0.15	0.31	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 7	11.1 / 12.3	ND	NA	NA			N	b
		Lead	0.029	0.029	mg/kg		1 / 13	0.024 / 0.029	0.029	NA	NA			Y	a
		Magnesium	241	504	mg/kg		13 / 13		504	NA	NA			N	c
		Manganese	0.24	3.4	mg/kg		11 / 13	0.15 / 0.17	3.4	NA	NA			Y	a
		Mercury	0.044	0.065	mg/kg		13 / 13		0.065	NA	NA			Y	a
		Molybdenum	0.045	0.047	mg/kg		2 / 13	0.031 / 0.036	0.047	NA	NA			Y	a
		Nickel	ND	ND	mg/kg		0 / 13	0.085 / 0.1	ND	NA	NA			N	b
		Potassium	2590	3710	mg/kg		13 / 13		3710	NA	NA			N	c
		Selenium	0.51	1.3	mg/kg		13 / 13		1.3	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 13	0.0025 / 0.0035	ND	NA	NA			N	b
		Sodium	277	723	mg/kg		13 / 13		723	NA	NA			N	c
		Strontium	0.13	14.3	mg/kg		13 / 13		14.3	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 13	0.012 / 0.02	ND	NA	NA			N	b
		Vanadium	0.066	0.074	mg/kg		2 / 13	0.04 / 0.0936	0.074	NA	NA			Y	a
		Zinc	11.5	17.4	mg/kg		11 / 13	2 / 11	17.4	NA	NA			Y	a
		Arsenate	ND	ND	mg/kg		0 / 2	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.114	0.114	mg/kg		1 / 2	0.107 / 0.181	0.114	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 2	0.0005 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 2	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.114	0.114	mg/kg		1 / 2	0.107 / 0.181	0.114	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.41
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reach B		Aluminum	ND	ND	mg/kg		0 / 11	3.5 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 11	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.036	0.039	mg/kg		2 / 11	0.025 / 0.0573	0.039	NA	NA			N	a, e
		Barium	0.042	0.11	mg/kg		4 / 11	0.04 / 0.048	0.11	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 11	0.026 / 0.0612	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 11	0.36 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 11	0.0067 / 0.0158	ND	NA	NA			N	b
		Calcium	99.7	2260	mg/kg		11 / 11		2260	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 11	0.11 / 0.13	ND	NA	NA			N	b
		Cobalt	0.014	0.027	mg/kg		4 / 11	0.012 / 0.014	0.027	NA	NA			Y	a
		Copper	0.22	2.9	mg/kg		11 / 11		2.9	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 11	10.6 / 12.5	ND	NA	NA			N	b
		Lead	0.028	0.12	mg/kg		2 / 11	0.024 / 0.029	0.12	NA	NA			Y	a
		Magnesium	205	268	mg/kg		11 / 11		268	NA	NA			N	c
		Manganese	0.16	1.1	mg/kg		11 / 11		1.1	NA	NA			Y	a
		Mercury	0.036	0.4	mg/kg		11 / 11		0.4	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 11	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 11	0.086 / 0.1	ND	NA	NA			N	b
		Potassium	3470	4260	mg/kg		11 / 11		4260	NA	NA			N	c
		Selenium	0.17	0.4	mg/kg		11 / 11		0.4	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 11	0.0025 / 0.003	ND	NA	NA			N	b
		Sodium	341	749	mg/kg		11 / 11		749	NA	NA			N	c
		Strontium	0.063	1.4	mg/kg		11 / 11		1.4	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 11	0.012 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 11	0.04 / 0.0928	ND	NA	NA			N	b
		Zinc	5.4	10.6	mg/kg		11 / 11		10.6	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 2	0.1 / 0.2	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 2	0.1 / 0.2	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 2	0.1 / 0.2	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 2	0.1 / 0.2	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 2	0.1 / 0.2	ND	NA	NA			N	b
		PCB-1254	ND	ND	mg/kg		0 / 2	0.1 / 0.2	ND	NA	NA			N	b
		PCB-1260	0.386	0.757	mg/kg		2 / 2		0.757	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.012	0.0338	mg/kg		2 / 2		0.0338	NA	NA			Y	a
		4,4'-DDT	0.0104	0.0164	mg/kg		2 / 2		0.0164	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0046	0.0046	mg/kg		1 / 2	0.0025 / 0.0025	0.0046	NA	NA			Y	a

TABLE 2.41
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		beta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Dieldrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 2	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	ND	ND	mg/kg		0 / 2	0.0025 / 0.0025	ND	NA	NA			N	b
		Methoxychlor	ND	ND	mg/kg		0 / 2	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 2	0.075 / 0.075	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 2	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 2	0.152 / 0.176	ND	NA	NA			N	b,e
		Arsenite	ND	ND	mg/kg		0 / 2	0.0007 / 0.001	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 2	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 2	0.152 / 0.176	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.42
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 18	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 18	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.13	0.49	mg/kg		18 / 18		0.49	NA	NA			N	a, e
		Barium	ND	ND	mg/kg		0 / 18	0.041 / 0.047	ND	NA	NA			N	b
		Beryllium	ND	ND	mg/kg		0 / 18	0.026 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 18	0.37 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 18	0.0068 / 0.0079	ND	NA	NA			N	b
		Calcium	89.3	875	mg/kg		18 / 18		875	NA	NA			N	c
		Chromium	0.16	0.43	mg/kg		3 / 18	0.11 / 0.13	0.43	NA	NA			Y	a
		Cobalt	0.014	0.014	mg/kg		1 / 18	0.013 / 0.015	0.014	NA	NA			Y	a
		Copper	0.15	0.61	mg/kg		18 / 18		0.61	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 18	10.8 / 12.5	ND	NA	NA			N	b
		Lead	0.044	0.044	mg/kg		1 / 18	0.025 / 0.029	0.044	NA	NA			Y	a
		Magnesium	245	329	mg/kg		18 / 18		329	NA	NA			N	c
		Manganese	0.17	0.24	mg/kg		7 / 18	0.15 / 0.18	0.24	NA	NA			Y	a
		Mercury	0.0589	0.169	mg/kg		18 / 18		0.169	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 18	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.29	mg/kg		3 / 18	0.088 / 0.23	0.29	NA	NA			Y	a
		Potassium	3510	4500	mg/kg		18 / 18		4500	NA	NA			N	c
		Selenium	0.4	1	mg/kg		18 / 18		1	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 18	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	337	501	mg/kg		18 / 18		501	NA	NA			N	c
		Strontium	0.043	0.79	mg/kg		18 / 18		0.79	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 18	0.012 / 0.018	ND	NA	NA			N	b
		Vanadium	0.081	0.081	mg/kg		1 / 18	0.041 / 0.047	0.081	NA	NA			Y	a
		Zinc	4.1	20.3	mg/kg		18 / 18		20.3	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.05	ND	NA	NA			N	b
		PCB-1254	0.069	0.069	mg/kg		1 / 3	0.05 / 0.05	0.069	NA	NA			Y	a
		PCB-1260	0.0813	0.192	mg/kg		3 / 3		0.192	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0083	0.0083	mg/kg		1 / 3	0.005 / 0.005	0.0083	NA	NA			Y	a
		4,4'-DDT	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.0054	0.0054	mg/kg		1 / 3	0.0025 / 0.0025	0.0054	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.42
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	0.0036	0.0036	mg/kg		1 / 3	0.0025 / 0.0025	0.0036	NA	NA			Y	b
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.0908 / 0.0908	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.0555 / 0.0555	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.04795 / 0.04795	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.02575 / 0.02575	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.02464 / 0.02464	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.03286 / 0.03286	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.04573 / 0.04573	ND	NA	NA			N	b,d
		Potassium-40	3.219	3.219	pCi/g		1 / 1		3.219	NA	NA			Y	a
		Radium-226	ND	ND	pCi/g		0 / 1	0.04618 / 0.04618	ND	NA	NA			N	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.0908 / 0.0908	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.0222 / 0.0222	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.0979 / 0.0979	ND	NA	NA			N	b
		Thorium-230	0.08414	0.08414	pCi/g		1 / 1		0.08414	NA	NA			Y	a
		Thorium-232	ND	ND	pCi/g		0 / 1	0.0444 / 0.0444	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	0.4795 / 0.4795	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.08036 / 0.08036	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.07792 / 0.07792	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.06305 / 0.06305	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.192	0.298	mg/kg		6 / 8	0.141 / 0.187	0.298	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0006 / 0.0009	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	0.192	0.298	mg/kg		6 / 8	0.141 / 0.187	0.298	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.43
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 29	3.5 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 29	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.034	0.31	mg/kg		28 / 29	0.025 / 0.028	0.31	NA	NA			N	a, e
		Barium	0.051	0.44	mg/kg		18 / 29	0.041 / 0.048	0.44	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 29	0.026 / 0.031	ND	NA	NA			N	b
		Boron	0.49	0.49	mg/kg		1 / 29	0.37 / 0.43	0.49	NA	NA			Y	a
		Cadmium	0.014	0.014	mg/kg		1 / 29	0.0067 / 0.0079	0.014	NA	NA			Y	a
		Calcium	95	7940	mg/kg		29 / 29		7940	NA	NA			N	c
		Chromium	0.24	0.31	mg/kg		2 / 29	0.11 / 0.13	0.31	NA	NA			Y	a
		Cobalt	0.017	0.017	mg/kg		1 / 29	0.012 / 0.015	0.017	NA	NA			Y	a
		Copper	0.15	0.46	mg/kg		28 / 29	0.13 / 0.14	0.46	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 29	10.7 / 12.5	ND	NA	NA			N	b
		Lead	0.043	0.043	mg/kg		1 / 29	0.025 / 0.029	0.043	NA	NA			Y	a
		Magnesium	218	368	mg/kg		29 / 29		368	NA	NA			N	c
		Manganese	0.17	8.8	mg/kg		24 / 29	0.15 / 0.18	8.8	NA	NA			Y	a
		Mercury	0.012	0.14	mg/kg		29 / 29		0.14	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 29	0.031 / 0.036	ND	NA	NA			N	b
		Nickel	0.11	0.17	mg/kg		3 / 29	0.086 / 0.38	0.17	NA	NA			Y	a
		Potassium	2530	4260	mg/kg		29 / 29		4260	NA	NA			N	c
		Selenium	0.38	1.1	mg/kg		29 / 29		1.1	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 29	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	233	549	mg/kg		29 / 29		549	NA	NA			N	c
		Strontium	0.049	5.8	mg/kg		28 / 29	0.039 / 0.046	5.8	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 29	0.012 / 0.016	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 29	0.04 / 0.047	ND	NA	NA			N	b
		Zinc	8	20.9	mg/kg		29 / 29		20.9	NA	NA			Y	a
		Arsenate	ND	ND	mg/kg		0 / 8	0.003 / 0.006	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	0.255	0.255	mg/kg		1 / 8	0.139 / 0.186	0.255	NA	NA			N	e
		Arsenite	ND	ND	mg/kg		0 / 8	0.0005 / 0.002	ND	NA	NA			N	b,e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.003 / 0.006	ND	NA	NA			N	b,e
		Organic Arsenic	0.255	0.255	mg/kg		1 / 8	0.139 / 0.186	0.255	NA	NA			N	e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.44
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 13	3.6 / 4.1	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 13	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.034	0.082	mg/kg		7 / 13	0.026 / 0.029	0.082	NA	NA			N	a, e
		Barium	0.048	0.35	mg/kg		5 / 13	0.042 / 0.047	0.35	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 13	0.027 / 0.03	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 13	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	0.02	0.02	mg/kg		1 / 13	0.0069 / 0.0078	0.02	NA	NA			Y	a
		Calcium	56.5	7660	mg/kg		13 / 13		7660	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 13	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	0.013	0.033	mg/kg		7 / 13	0.013 / 0.014	0.033	NA	NA			Y	a
		Copper	0.25	3.7	mg/kg		13 / 13		3.7	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 13	11 / 12.4	ND	NA	NA			N	b
		Lead	0.027	0.18	mg/kg		2 / 13	0.025 / 0.029	0.18	NA	NA			Y	a
		Magnesium	194	347	mg/kg		13 / 13		347	NA	NA			N	c
		Manganese	0.19	3	mg/kg		8 / 13	0.16 / 0.18	3	NA	NA			Y	a
		Mercury	0.045	0.23	mg/kg		13 / 13		0.23	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 13	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	0.16	0.41	mg/kg		4 / 13	0.089 / 0.1	0.41	NA	NA			Y	a
		Potassium	3040	3910	mg/kg		13 / 13		3910	NA	NA			N	c
		Selenium	0.15	0.38	mg/kg		13 / 13		0.38	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 13	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	296	559	mg/kg		13 / 13		559	NA	NA			N	c
		Strontium	0.062	4.5	mg/kg		13 / 13		4.5	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 13	0.013 / 0.014	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 13	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	4.3	13.3	mg/kg		13 / 13		13.3	NA	NA			Y	a
		PCB-1016	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1221	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1232	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1242	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1248	ND	ND	mg/kg		0 / 3	0.05 / 0.1	ND	NA	NA			N	b
		PCB-1254	0.0687	0.189	mg/kg		3 / 3		0.189	NA	NA			Y	a
		PCB-1260	0.153	0.441	mg/kg		3 / 3		0.441	NA	NA			Y	a
		4,4'-DDD	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		4,4'-DDE	0.0069	0.0288	mg/kg		3 / 3		0.0288	NA	NA			Y	a
		4,4'-DDT	0.005	0.0128	mg/kg		3 / 3		0.0128	NA	NA			Y	a
		Aldrin	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		alpha-Chlordane	0.003	0.014	mg/kg		3 / 3		0.014	NA	NA			Y	a
		beta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		delta-BHC	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b

TABLE 2.44
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
		Dieldrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan I	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Endosulfan II	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endosulfan Sulfate	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin aldehyde	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		Endrin Ketone	ND	ND	mg/kg		0 / 3	0.005 / 0.005	ND	NA	NA			N	b
		gamma-BHC (Lindane)	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		gamma-Chlordane	0.0043	0.0084	mg/kg		2 / 3	0.0025 / 0.0025	0.0084	NA	NA			Y	a
		Heptachlor	ND	ND	mg/kg		0 / 3	0.0025 / 0.0025	ND	NA	NA			N	b
		Heptachlor Epoxide	0.0027	0.0035	mg/kg		2 / 3	0.0025 / 0.0025	0.0035	NA	NA			Y	a
		Methoxychlor	ND	ND	mg/kg		0 / 3	0.025 / 0.025	ND	NA	NA			N	b
		Toxaphene	ND	ND	mg/kg		0 / 3	0.075 / 0.075	ND	NA	NA			N	b
		Actinium-228	ND	ND	pCi/g		0 / 1	0.1244 / 0.1244	ND	NA	NA			N	b
		Americium-241	ND	ND	pCi/g		0 / 1	0.1083 / 0.1083	ND	NA	NA			N	b
		Bismuth-214	ND	ND	pCi/g		0 / 1	0.07196 / 0.07196	ND	NA	NA			N	b,d
		Cesium-137	ND	ND	pCi/g		0 / 1	0.03317 / 0.03317	ND	NA	NA			N	b
		Cobalt-60	ND	ND	pCi/g		0 / 1	0.03417 / 0.03417	ND	NA	NA			N	b
		Lead-212	ND	ND	pCi/g		0 / 1	0.05507 / 0.05507	ND	NA	NA			N	b,d
		Lead-214	ND	ND	pCi/g		0 / 1	0.06633 / 0.06633	ND	NA	NA			N	b,d
		Potassium-40	3.518	3.518	pCi/g		1 / 1		3.518	NA	NA			Y	a
		Radium-226	0.05889	0.05889	pCi/g		1 / 1		0.05889	NA	NA			Y	a
		Radium-228	ND	ND	pCi/g		0 / 1	0.1244 / 0.1244	ND	NA	NA			N	b
		Thallium-208	ND	ND	pCi/g		0 / 1	0.02894 / 0.02894	ND	NA	NA			N	b,d
		Thorium-228	ND	ND	pCi/g		0 / 1	0.09909 / 0.09909	ND	NA	NA			N	b
		Thorium-230	ND	ND	pCi/g		0 / 1	0.08965 / 0.08965	ND	NA	NA			N	b
		Thorium-232	ND	ND	pCi/g		0 / 1	0.0406 / 0.0406	ND	NA	NA			N	b
		Thorium-234	ND	ND	pCi/g		0 / 1	1.045 / 1.045	ND	NA	NA			N	b
		Uranium-234	ND	ND	pCi/g		0 / 1	0.08161 / 0.08161	ND	NA	NA			N	b
		Uranium-235	ND	ND	pCi/g		0 / 1	0.07919 / 0.07919	ND	NA	NA			N	b
		Uranium-238	ND	ND	pCi/g		0 / 1	0.06412 / 0.06412	ND	NA	NA			N	b
		Arsenate	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Arsenic (from speciation lab)	ND	ND	mg/kg		0 / 8	0.105 / 0.196	ND	NA	NA			N	b,e
		Arsenite	0.0006	0.001	mg/kg		4 / 8	0.0005 / 0.001	0.001	NA	NA			Y	e
		Inorganic Arsenic	ND	ND	mg/kg		0 / 8	0.004 / 0.005	ND	NA	NA			N	b,e
		Organic Arsenic	ND	ND	mg/kg		0 / 8	0.105 / 0.196	ND	NA	NA			N	b,e

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 2.45
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Clinch River Reference Reach		Aluminum	ND	ND	mg/kg		0 / 6	3.6 / 4.2	ND	NA	NA			N	b
		Antimony	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Arsenic	0.25	0.35	mg/kg		6 / 6		0.35	NA	NA			N	b,e
		Barium	0.054	0.054	mg/kg		1 / 6	0.042 / 0.048	0.054	NA	NA			Y	a
		Beryllium	ND	ND	mg/kg		0 / 6	0.027 / 0.031	ND	NA	NA			N	b
		Boron	ND	ND	mg/kg		0 / 6	0.38 / 0.43	ND	NA	NA			N	b
		Cadmium	ND	ND	mg/kg		0 / 6	0.0069 / 0.0079	ND	NA	NA			N	b
		Calcium	117	1340	mg/kg		6 / 6		1340	NA	NA			N	c
		Chromium	ND	ND	mg/kg		0 / 6	0.12 / 0.13	ND	NA	NA			N	b
		Cobalt	ND	ND	mg/kg		0 / 6	0.013 / 0.015	ND	NA	NA			N	b
		Copper	0.17	0.21	mg/kg		6 / 6		0.21	NA	NA			Y	a
		Iron	ND	ND	mg/kg		0 / 6	10.9 / 12.5	ND	NA	NA			N	b
		Lead	ND	ND	mg/kg		0 / 6	0.025 / 0.029	ND	NA	NA			N	b
		Magnesium	252	313	mg/kg		6 / 6		313	NA	NA			N	c
		Manganese	0.44	0.44	mg/kg		1 / 6	0.15 / 0.18	0.44	NA	NA			Y	a
		Mercury	0.033	0.18	mg/kg		6 / 6		0.18	NA	NA			Y	a
		Molybdenum	ND	ND	mg/kg		0 / 6	0.032 / 0.036	ND	NA	NA			N	b
		Nickel	ND	ND	mg/kg		0 / 6	0.089 / 0.1	ND	NA	NA			N	b
		Potassium	3710	4210	mg/kg		6 / 6		4210	NA	NA			N	c
		Selenium	0.29	0.45	mg/kg		6 / 6		0.45	NA	NA			Y	a
		Silver	ND	ND	mg/kg		0 / 6	0.0026 / 0.003	ND	NA	NA			N	b
		Sodium	265	326	mg/kg		6 / 6		326	NA	NA			N	c
		Strontium	0.064	0.91	mg/kg		6 / 6		0.91	NA	NA			Y	a
		Thallium	ND	ND	mg/kg		0 / 6	0.014 / 0.029	ND	NA	NA			N	b
		Vanadium	ND	ND	mg/kg		0 / 6	0.042 / 0.047	ND	NA	NA			N	b
		Zinc	5.2	6.8	mg/kg		6 / 6		6.8	NA	NA			Y	a

(a) All detected inorganic or organic constituents and radionuclides are retained as COPCs

(b) Only detected inorganic or organic constituents and radionuclides are retained as COPCs

(c) Essential nutrients were not retained as COPCs.

(d) Short lived radionuclide daughter products were not retained as COPCs, but were evaluated using toxicity values for the parent radionuclide that account for the presence of these short lived radionuclides.

(e) Arsenic was evaluated using the data for arsenic species. Organic arsenic was not retained as a COPC as it is not considered to be toxic to humans.

NA = Not applicable (Background concentrations and Screening Toxicity Values were not used in the selection or elimination of COPCs)

ND = Not Detected

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach A	Aluminum, Total	mg/L	0.13083	Nonparametric	0.255	0.149	mg/L	95% KM (t) UCL	ProUCL output
	Antimony, Total	mg/L	0.00034	None	0.00042	0.00042	mg/L	Maximum	Insufficient number of detects
	Arsenic, Total	mg/L	0.00133	Gamma	0.00252	0.00171	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Barium, Total	mg/L	0.04073	Normal	0.0487	0.0428	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.02032	Normal	0.0298	0.0224	mg/L	Use 95% Student's-t UCL	
	Chromium, Total	mg/L	0.00053	Nonparametric	0.00271	0.00083938	mg/L	95% KM (% Bootstrap) UCL	
	Copper, Total	mg/L	0.00135	Gamma	0.00212	0.00168	mg/L	Use 95% Approximate Gamma UCL	
	Iron, Total	mg/L	0.10629	Gamma	0.22	0.121	mg/L	Use 95% Approximate Gamma UCL	
	Manganese, Total	mg/L	0.02969	Normal	0.0393	0.0316	mg/L	Use 95% Student's-t UCL	
	Mercury, Total	mg/L	0.00015	None	0.00019	0.00019	mg/L	Maximum	Insufficient number of detects
	Molybdenum, Total	mg/L	0.001	Nonparametric	0.0015	0.00058	mg/L	95% KM (t) UCL	
	Nickel, Total	mg/L	0.00051	Normal	0.00072	0.00049375	mg/L	Use 95% Student's-t UCL	
	Selenium, Total	mg/L	0.0004	Nonparametric	0.00093	0.00093	mg/L	95% KM (t) UCL	ProUCL output
	Strontium, Total	mg/L	0.11644	Normal	0.126	0.0968	mg/L	Use 95% Student's-t UCL	ProUCL output
	Vanadium, Total	mg/L	0.00165	Nonparametric	0.00301	0.00301	mg/L	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Zinc, Total	mg/L	0.00874	None	0.0137	0.0137	mg/L	Maximum	Insufficient number of detects
	Radium-226	pCi/L	0.63375	None	0.88	0.88	pCi/L	Maximum	Insufficient number of samples
	Uranium-234	pCi/L	0.18175	None	0.265	0.265	pCi/L	Maximum	Insufficient number of samples
	Uranium-238	pCi/L	0.15425	None	0.171	0.171	pCi/L	Maximum	Insufficient number of samples

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach B	Aluminum, Total	mg/L	0.2015	Nonparametric	0.319	0.231	mg/L	95% KM (t) UCL	ProUCL output
	Arsenic, Total	mg/L	0.00198	Normal	0.00278	0.0022	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.04688	Normal	0.054	0.0492	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.02103	Normal	0.027	0.0225	mg/L	Use 95% Student's-t UCL	ProUCL output
	Chromium, Total	mg/L	0.00035	None	0.0005	0.0005	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00111	Normal	0.00173	0.00125	mg/L	Use 95% Student's-t UCL	ProUCL output
	Iron, Total	mg/L	0.16888	Nonparametric	0.251	0.193	mg/L	95% KM (t) UCL	ProUCL output
	Manganese, Total	mg/L	0.05764	Normal	0.101	0.0674	mg/L	Use 95% Student's-t UCL	ProUCL output
	Mercury, Total	mg/L	0.00015	None	0.00019	0.00019	mg/L	Maximum	Insufficient number of detects
	Molybdenum, Total	mg/L	0.00094	Nonparametric	0.0013	0.00101	mg/L	95% KM (t) UCL	ProUCL output
	Nickel, Total	mg/L	0.00058	Normal	0.00086	0.00062873	mg/L	Use 95% Student's-t UCL	ProUCL output
	Selenium, Total	mg/L	0.00037	Nonparametric	0.00055	0.00040471	mg/L	95% KM (t) UCL	ProUCL output
	Strontium, Total	mg/L	0.11356	Gamma	0.123	0.116	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Vanadium, Total	mg/L	0.00154	Nonparametric	0.00217	0.00169	mg/L	95% KM (t) UCL	ProUCL output
	Thorium-230	pCi/L	0.08798	None	0.132	0.132	pCi/L	Maximum	Insufficient number of samples
	Uranium-234	pCi/L	0.15675	None	0.173	0.173	pCi/L	Maximum	Insufficient number of samples
	Uranium-238	pCi/L	0.123	None	0.109	0.109	pCi/L	Maximum	Insufficient number of samples

TABLE 3.3.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach C	Aluminum, Total	mg/L	0.175	Nonparametric	0.339	0.218	mg/L	95% KM (t) UCL	ProUCL output
	Arsenic, Total	mg/L	0.00198	Normal	0.00256	0.00227	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.0505	Normal	0.0544	0.0537	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.0202	Normal	0.0228	0.0216	mg/L	Use 95% Student's-t UCL	ProUCL output
	Chromium, Total	mg/L		None		0.00047	mg/L	Maximum	Insufficient number of detects
	Cobalt, Total	mg/L		None		0.00046	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L		Normal		0.00089991	mg/L	Use 95% Student's-t UCL	ProUCL output
	Iron, Total	mg/L		Normal		0.227	mg/L	Use 95% Student's-t UCL	ProUCL output
	Manganese, Total	mg/L		Normal		0.177	mg/L	Use 95% Student's-t UCL	ProUCL output
	Molybdenum, Total	mg/L		Nonparametric		0.00098626	mg/L	95% KM (t) UCL	ProUCL output
	Nickel, Total	mg/L	0.00077625	Normal	0.00098	0.00069508	mg/L	Use 95% Student's-t UCL	ProUCL output
	Strontium, Total	mg/L	0.179	Normal	0.316	0.111	mg/L	Maximum	ProUCL UCL equal the maximum detect
	Vanadium, Total	mg/L	0.132	None	0.225	0.00153	mg/L	Maximum	Insufficient number of detects
	Radium-228	pCi/L	0.00092857	None	0.00114	3.77	pCi/L	Maximum	Insufficient number of samples
	Uranium-234	pCi/L	0.00061875	None	0.00083	0.251	pCi/L	Maximum	Insufficient number of samples
	Uranium-238	pCi/L	0.108	None	0.111	0.252	pCi/L	Maximum	Insufficient number of samples

TABLE 3.4.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reference Reach	Arsenic, Total	mg/L	0.00071	Normal	0.0013	0.00089238	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.04861	Normal	0.0531	0.0505	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.01828	Normal	0.0198	0.0189	mg/L	Use 95% Student's-t UCL	ProUCL output
	Chromium, Total	mg/L	0.00034	None	0.00041	0.00041	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00042	Nonparametric	0.00067	0.00050124	mg/L	95% KM (t) UCL	ProUCL output
	Iron, Total	mg/L	0.0909	Normal	0.133	0.106	mg/L	Use 95% Student's-t UCL	ProUCL output
	Manganese, Total	mg/L	0.09414	Normal	0.196	0.128	mg/L	Use 95% Student's-t UCL	ProUCL output
	Mercury, Total	mg/L	0.00015	None	0.00017	0.00017	mg/L	Maximum	Insufficient number of detects
	Molybdenum, Total	mg/L	0.0007	Normal	0.00091	0.0007864	mg/L	Use 95% Student's-t UCL	ProUCL output
	Nickel, Total	mg/L	0.00053	Nonparametric	0.00072	0.00060735	mg/L	95% KM (t) UCL	ProUCL output
	Selenium, Total	mg/L	0.00034	None	0.00038	0.00038	mg/L	Maximum	Insufficient number of detects
	Strontium, Total	mg/L	0.09679	Normal	0.107	0.102	mg/L	Use 95% Student's-t UCL	ProUCL output
	Uranium-238	pCi/L	0.132	None	0.147	0.147	pCi/L	Maximum	Insufficient number of samples

TABLE 3.5.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach A	Aluminum, Total	mg/L	0.12883	Nonparametric	0.214	0.155	mg/L	95% KM (t) UCL	ProUCL output
	Arsenic, Total	mg/L	0.00109	Normal	0.00153	0.00125	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.0395	Normal	0.0442	0.0415	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.01961	Normal	0.0267	0.0221	mg/L	Use 95% Student's-t UCL	ProUCL output
	Chromium, Total	mg/L	0.00035	None	0.00046	0.00046	mg/L	Maximum	Insufficient number of detects
	Cobalt, Total	mg/L	0.00033	None	0.00033	0.00033	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00136	Normal	0.00195	0.00161	mg/L	Use 95% Student's-t UCL	ProUCL output
	Iron, Total	mg/L	0.10023	Normal	0.15	0.117	mg/L	Use 95% Student's-t UCL	ProUCL output
	Manganese, Total	mg/L	0.02925	Normal	0.0326	0.0311	mg/L	Use 95% Student's-t UCL	ProUCL output
	Mercury, Total	mg/L	0.00016	None	0.00023	0.00023	mg/L	Maximum	Insufficient number of detects
	Molybdenum, Tota	mg/L	0.00077	Normal	0.00104	0.00089236	mg/L	Use 95% Student's-t UCL	ProUCL output
	Nickel, Total	mg/L	0.00049	Nonparametric	0.00076	0.00058332	mg/L	95% KM (t) UCL	ProUCL output
	Selenium, Total	mg/L	0.00039	None	0.00076	0.00076	mg/L	Maximum	Insufficient number of detects
	Strontium, Total	mg/L	0.11513	Normal	0.123	0.119	mg/L	Use 95% Student's-t UCL	ProUCL output
	Vanadium, Total	mg/L	0.00138	Normal	0.00197	0.00162	mg/L	Use 95% Student's-t UCL	ProUCL output
	Uranium-234	pCi/L	0.2095	None	0.155	0.155	pCi/L	Maximum	Insufficient number of samples

TABLE 3.6.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach B	Aluminum, Total	mg/L	0.11131	Nonparametric	0.139	0.125	mg/L	95% KM (t) UCL	ProUCL output
	Arsenic, Total	mg/L	0.00089	Gamma	0.00195	0.00125	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Barium, Total	mg/L	0.03811	Normal	0.0415	0.0395	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.01729	Nonparametric	0.024	0.0196	mg/L	95% KM (t) UCL	ProUCL output
	Chromium, Total	mg/L	0.00034	None	0.00039	0.00039	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00134	Gamma	0.00256	0.00182	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Iron, Total	mg/L	0.1039	Normal	0.133	0.119	mg/L	Use 95% Student's-t UCL	ProUCL output
	Manganese, Total	mg/L	0.03171	Normal	0.0391	0.0342	mg/L	Use 95% Student's-t UCL	ProUCL output
	Molybdenum, Total	mg/L	0.00081	Normal	0.00104	0.0009272	mg/L	Use 95% Student's-t UCL	ProUCL output
	Nickel, Total	mg/L	0.00049	Nonparametric	0.00059	0.00054319	mg/L	95% KM (t) UCL	ProUCL output
	Selenium, Total	mg/L	0.00034	None	0.00038	0.00038	mg/L	Maximum	Insufficient number of detects
	Strontium, Total	mg/L	0.11288	Normal	0.116	0.115	mg/L	Use 95% Student's-t UCL	ProUCL output
	Vanadium, Total	mg/L	0.00128	Nonparametric	0.00221	0.00161	mg/L	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Radium-226	pCi/g	0.4535	None	0.499	0.499	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	0.198	None	0.156	0.156	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	0.19	None	0.172	0.172	pCi/g	Maximum	Insufficient number of samples

TABLE 3.7.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reference Reach	Aluminum, Total	mg/L	0.08321	Nonparametric	0.107	0.0918	mg/L	95% KM (t) UCL	ProUCL output
	Arsenic, Total	mg/L	0.0005	Normal	0.00061	0.00054829	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.03536	Normal	0.0375	0.0362	mg/L	Use 95% Student's-t UCL	ProUCL output
	Boron, Total	mg/L	0.01544	Normal	0.0192	0.017	mg/L	Use 95% Student's-t UCL	ProUCL output
	Chromium, Total	mg/L	0.00035	None	0.00051	0.00051	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00071	Gamma	0.00158	0.00099961	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Iron, Total	mg/L	0.09041	None	0.126	0.126	mg/L	Maximum	Insufficient number of detects
	Manganese, Total	mg/L	0.02986	None	0.0351	0.0351	mg/L	Maximum	Insufficient number of detects
	Molybdenum, Total	mg/L	0.00061	Normal	0.00094	0.00078376	mg/L	Use 95% Student's-t UCL	ProUCL output
	Nickel, Total	mg/L	0.00043	None	0.00065	0.00065	mg/L	Maximum	Insufficient number of detects
	Selenium, Total	mg/L	0.00034	None	0.00043	0.00043	mg/L	Maximum	Insufficient number of detects
	Strontium, Total	mg/L	0.11144	Normal	0.116	0.114	mg/L	Use 95% Student's-t UCL	ProUCL output
	Uranium-234	mg/L	0.24933	None	0.268	0.268	mg/L	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	0.174	None	0.129	0.129	pCi/g	Maximum	Insufficient number of samples

TABLE 3.8.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tennessee River Reach A	Aluminum, Total	mg/L	0.12454	Nonparametric	0.263	0.167	mg/L	95% KM (t) UCL	ProUCL output
	Arsenic, Total	mg/L	0.00081	Normal	0.00131	0.00097102	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.03005	Gamma	0.0396	0.0331	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Beryllium, Total	mg/L	0.00035	None	0.00048	0.00048	mg/L	Maximum	Insufficient number of detects
	Boron, Total	mg/L	0.01506	Normal	0.0182	0.0164	mg/L	Use 95% Student's-t UCL	ProUCL output
	Chromium, Total	mg/L	0.00034	None	0.00043	0.00043	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00096	Gamma	0.00219	0.00134	mg/L	Use 95% Approximate Gamma UCL	ProUCL output
	Iron, Total	mg/L	0.12146	Nonparametric	0.236	0.164	mg/L	95% KM (t) UCL	ProUCL output
	Manganese, Total	mg/L	0.05097	Nonparametric	0.0943	0.0692	mg/L	95% KM (t) UCL	ProUCL output
	Molybdenum, Total	mg/L	0.00047	Nonparametric	0.0006	0.00055125	mg/L	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Nickel, Total	mg/L	0.0005	None	0.00113	0.00113	mg/L	Maximum	Insufficient number of detects
	Strontium, Total	mg/L	0.08416	Normal	0.107	0.0919	mg/L	Use 95% Student's-t UCL	ProUCL output
	Vanadium, Total	mg/L	0.00107	None	0.00153	0.00153	mg/L	Maximum	Insufficient number of detects
	Radium-226	pCi/g	0.501	None	0.609	0.609	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	0.1501	None	0.235	0.235	pCi/g	Maximum	Insufficient number of samples

TABLE 3.9.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tennessee River Reference Reach	Aluminum, Total	mg/L	0.12649	Normal	0.206	0.152	mg/L	Use 95% Student's-t UCL	ProUCL output
	Arsenic, Total	mg/L	0.0007	Normal	0.00117	0.00088324	mg/L	Use 95% Student's-t UCL	ProUCL output
	Barium, Total	mg/L	0.02978	Normal	0.0371	0.0335	mg/L	or 95% Modified-t UCL	ProUCL output
	Boron, Total	mg/L	0.01474	Nonparametric	0.017	0.0166	mg/L	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Chromium, Total	mg/L	0.00034	None	0.00038	0.00038	mg/L	Maximum	Insufficient number of detects
	Copper, Total	mg/L	0.00078	Normal	0.00129	0.00097212	mg/L	Use 95% Student's-t UCL	ProUCL output
	Iron, Total	mg/L	0.14613	Normal	0.199	0.169	mg/L	or 95% Modified-t UCL	ProUCL output
	Manganese, Total	mg/L	0.05968	Normal	0.0766	0.0653	mg/L	Use 95% Student's-t UCL	ProUCL output
	Molybdenum, Total	mg/L	0.00045	Nonparametric	0.00073	0.00058	mg/L	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Nickel, Total	mg/L	0.00041	Nonparametric	0.0006	0.00049375	mg/L	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Selenium, Total	mg/L	0.00035	None	0.00045	0.00045	mg/L	Maximum	Insufficient number of detects
	Strontium, Total	mg/L	0.08415	Normal	0.109	0.0968	mg/L	95% Modified-t UCL	ProUCL output
	Vanadium, Total	mg/L	0.00103	None	0.00122	0.00122	mg/L	Maximum	Insufficient number of detects
	Uranium-234	pCi/g	0.1765	None	0.16	0.16	pCi/g	Maximum	Insufficient number of samples

TABLE 3.10.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach A	Aluminum	mg/kg	29850	Gamma	76500	40823	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Antimony	mg/kg	1.52	None	1.8	1.8	mg/kg	Maximum	Insufficient number of detects
	Arsenic	mg/kg	14.3375	Normal	32.3	18.72	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Barium	mg/kg	142.2	Normal	245	169.8	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Beryllium	mg/kg	1.20125	Nonparametric	2.19	1.52	mg/kg	95% KM (t) UCL	ProUCL output
	Boron	mg/kg	23.25	Gamma	88	35.39	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Chromium	mg/kg	38.79166667	Normal	86	49.16	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Cobalt	mg/kg	18.75	Gamma	46.6	24.88	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Copper	mg/kg	17.56916667	Normal	31.7	22.06	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Hex. Chromium	mg/kg	0.703333333	None	1.2	1.2	mg/kg	Maximum	Insufficient number of detects
	Lead	mg/kg	27.625	Nonparametric	126	67.89	mg/kg	Use 95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Manganese	mg/kg	955.5833333	Gamma	2910	1511	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Mercury	mg/kg	0.071666667	0.0E+00	0.13	0.0865	mg/kg	95% KM (t) UCL	ProUCL output
	Nickel	mg/kg	19.83083333	Normal	40.6	25.41	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Selenium	mg/kg	1.629166667	None	3.05	3.05	mg/kg	Maximum	Insufficient number of detects
	Strontium	mg/kg	39.87	Nonparametric	149	102.2	mg/kg	Use 95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Vanadium	mg/kg	46.9	Normal	80.1	55.44	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	58.99166667	Gamma	132	74.73	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Iron	mg/kg	32966.66667	Normal	48200	39267	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Anthracene	mg/kg	0.000816667	None	0.001	0.001	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)anthracene	mg/kg	0.00499	None	0.0077	0.0077	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)pyrene	mg/kg	0.004556667	None	0.0079	0.0079	mg/kg	Maximum	Insufficient number of samples
	Benzo(b)fluoranthene	mg/kg	0.01209	None	0.027	0.027	mg/kg	Maximum	Insufficient number of samples
	Benzo(g,h,i)perylene	mg/kg	0.001656667	None	0.0022	0.0022	mg/kg	Maximum	Insufficient number of samples
	Benzo(k)fluoranthene	mg/kg	0.008123333	None	0.018	0.018	mg/kg	Maximum	Insufficient number of samples
	Chrysene	mg/kg	0.00659	None	0.013	0.013	mg/kg	Maximum	Insufficient number of samples
	Dibenz(a,h)anthracene	mg/kg	0.000936667	None	0.0012	0.0012	mg/kg	Maximum	Insufficient number of samples
	Fluoranthene	mg/kg	0.007556667	None	0.012	0.012	mg/kg	Maximum	Insufficient number of samples

TABLE 3.10.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Indeno(1,2,3-cd)pyrene	mg/kg	0.00199	None	0.0029	0.0029	mg/kg	Maximum	Insufficient number of samples
	Naphthalene	mg/kg	0.00074	None	0.00077	0.00077	mg/kg	Maximum	Insufficient number of samples
	Phenanthrene	mg/kg	0.00139	None	0.0021	0.0021	mg/kg	Maximum	Insufficient number of samples
	Pyrene	mg/kg	0.009556667	None	0.017	0.017	mg/kg	Maximum	Insufficient number of samples
	alpha-Chlordane	mg/kg	0.007906667	None	0.023	0.023	mg/kg	Maximum	Insufficient number of samples
	beta-BHC	mg/kg	0.00165	None	0.00062	0.00062	mg/kg	Maximum	Insufficient number of samples
	gamma-Chlordane	mg/kg	0.01224	None	0.036	0.036	mg/kg	Maximum	Insufficient number of samples
	Cesium-137	pCi/g	0.177766667	None	0.406	0.406	pCi/g	Maximum	Insufficient number of samples
	Potassium-40	pCi/g	18.23333333	None	23.3	23.3	pCi/g	Maximum	Insufficient number of samples
	Radium-226	pCi/g	1.029666667	None	1.08	1.08	pCi/g	Maximum	Insufficient number of samples
	Radium-228	pCi/g	1.476666667	None	1.68	1.68	pCi/g	Maximum	Insufficient number of samples
	Thorium-228	pCi/g	1.523333333	None	1.8	1.8	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	1.336666667	None	1.55	1.55	pCi/g	Maximum	Insufficient number of samples
	Thorium-232	pCi/g	1.313333333	None	1.61	1.61	pCi/g	Maximum	Insufficient number of samples
	Thorium-234	pCi/g	1.427	None	0.981	0.981	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	1.004	None	1.31	1.31	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	1.119666667	None	1.26	1.26	pCi/g	Maximum	Insufficient number of samples

TABLE 3.11.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach B	Aluminum	mg/kg	17585.55556	Normal	39400	21792	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Antimony	mg/kg	1.435555556	None	2.26	2.26	mg/kg	Maximum	Insufficient number of detects
	Arsenic	mg/kg	15.18	Nonparametric	62.4	31.33	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Barium	mg/kg	125.4055556	Lognormal	478	193.2	mg/kg	Use 95% H-UCL	ProUCL output
	Beryllium	mg/kg	1.078277778	Nonparametric	3.52	1.417	mg/kg	95% KM (BCA) UCL	ProUCL output
	Boron	mg/kg	14.70666667	Nonparametric	51.8	20.81	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Chromium	mg/kg	22.35444444	Normal	42.4	27.62	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Cobalt	mg/kg	13.74111111	Gamma	38.1	18.42	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Copper	mg/kg	16.48277778	Normal	47.1	21.72	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Hex. Chromium	mg/kg	0.538	None	0.45	0.45	mg/kg	Maximum	Insufficient number of detects
	Lead	mg/kg	21.44444444	Gamma	79.5	31.51	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Manganese	mg/kg	826.2222222	Gamma	4120	1381	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Mercury	mg/kg	0.069333333	0.0E+00	0.12	0.078	mg/kg	95% KM (t) UCL	ProUCL output
	Nickel	mg/kg	19.07111111	Gamma	54.7	25.82	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Selenium	mg/kg	1.528333333	None	3.64	3.64	mg/kg	Maximum	Insufficient number of detects
	Strontium	mg/kg	43.27277778	Nonparametric	321	119.6	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Vanadium	mg/kg	31.52777778	Normal	78.6	39.47	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	46.95	Gamma	113	57.66	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Iron	mg/kg	21851.11111	Normal	40000	26649	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Acenaphthene	mg/kg	0.0015275	None	0.0019	0.0019	mg/kg	Maximum	Insufficient number of samples
	Anthracene	mg/kg	0.0066525	None	0.021	0.021	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)anthracene	mg/kg	0.020025	None	0.055	0.055	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)pyrene	mg/kg	0.0208	None	0.061	0.061	mg/kg	Maximum	Insufficient number of samples
	Benzo(b)fluoranthene	mg/kg	0.031075	None	0.09	0.09	mg/kg	Maximum	Insufficient number of samples
	Benzo(g,h,i)perylene	mg/kg	0.0099	None	0.026	0.026	mg/kg	Maximum	Insufficient number of samples
	Benzo(k)fluoranthene	mg/kg	0.021825	None	0.065	0.065	mg/kg	Maximum	Insufficient number of samples
	Chrysene	mg/kg	0.027425	None	0.08	0.08	mg/kg	Maximum	Insufficient number of samples
	Dibenz(a,h)anthracene	mg/kg	0.00362	None	0.01	0.01	mg/kg	Maximum	Insufficient number of samples

TABLE 3.11.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Fluoranthene	mg/kg	0.031275	None	0.074	0.074	mg/kg	Maximum	Insufficient number of samples
	Fluorene	mg/kg	0.0021	None	0.0041	0.0041	mg/kg	Maximum	Insufficient number of samples
	Indeno(1,2,3-cd)pyrene	mg/kg	0.0098	None	0.028	0.028	mg/kg	Maximum	Insufficient number of samples
	Naphthalene	mg/kg	0.00348	None	0.006	0.006	mg/kg	Maximum	Insufficient number of samples
	Phenanthrene	mg/kg	0.01178	None	0.026	0.026	mg/kg	Maximum	Insufficient number of samples
	Pyrene	mg/kg	0.0295	None	0.071	0.071	mg/kg	Maximum	Insufficient number of samples
	PCB-1254	mg/kg	0.00216	None	0.0032	0.0032	mg/kg	Maximum	Insufficient number of samples
	PCB-1260	mg/kg	0.00272	None	0.0052	0.0052	mg/kg	Maximum	Insufficient number of samples
	4,4'-DDT	mg/kg	0.001252	None	0.0033	0.0033	mg/kg	Maximum	Insufficient number of samples
	beta-BHC	mg/kg	0.000524	None	0.001	0.001	mg/kg	Maximum	Insufficient number of samples
	Heptachlor	mg/kg	0.000434	None	0.00055	0.00055	mg/kg	Maximum	Insufficient number of samples
	Cesium-137	pCi/g	0.11742	None	0.328	0.328	pCi/g	Maximum	Insufficient number of samples
	Potassium-40	pCi/g	15.866	None	42.8	42.8	pCi/g	Maximum	Insufficient number of samples
	Radium-226	pCi/g	1.3604	None	3.68	3.68	pCi/g	Maximum	Insufficient number of samples
	Radium-228	pCi/g	1.3856	None	2.82	2.82	pCi/g	Maximum	Insufficient number of samples
	Thorium-228	pCi/g	1.1686	None	2.64	2.64	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	1.3798	None	4.11	4.11	pCi/g	Maximum	Insufficient number of samples
	Thorium-232	pCi/g	1.3846	None	3.03	3.03	pCi/g	Maximum	Insufficient number of samples
	Thorium-234	pCi/g	1.7392	None	4.37	4.37	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	1.1978	None	2.94	2.94	pCi/g	Maximum	Insufficient number of samples
	Uranium-235	pCi/g	0.08142	None	0.13	0.13	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	1.3532	None	3.53	3.53	pCi/g	Maximum	Insufficient number of samples

TABLE 3.12.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach C	Aluminum	mg/kg	9164	Gamma	27100	21792	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Arsenic	mg/kg	2.505	Nonparametric	5.17	2.26	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Barium	mg/kg	92.48	Lognormal	447	31.33	mg/kg	Use 95% H-UCL	ProUCL output
	Beryllium	mg/kg	0.6634	None	1.09	193.2	mg/kg	Maximum	Insufficient number of detects
	Boron	mg/kg	6.383	None	10.3	1.417	mg/kg	Maximum	Insufficient number of detects
	Chromium	mg/kg	9.959	Gamma	24.3	20.81	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Cobalt	mg/kg	7.144	Gamma	20.4	27.62	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Copper	mg/kg	5.076	Gamma	13.2	18.42	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Lead	mg/kg	6.688	Normal	14	21.72	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	557.35	Gamma	2940	0.45	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	8.556	Gamma	22.4	31.51	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Strontium	mg/kg	8.125	None	19.9	1381	mg/kg	Maximum	Insufficient number of detects
	Vanadium	mg/kg	13.083	Normal	36.6	0.078	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	32.35	Lognormal	84.8	25.82	mg/kg	Use 95% H-UCL	ProUCL output
	Iron	mg/kg	9607	Normal	19100	3.64	mg/kg	Use 95% Student's-t UCL	Insufficient number of detects
	Anthracene	mg/kg	0.00145	None	0.0022	119.6	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)anthracene	mg/kg	0.01035	None	0.019	39.47	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)pyrene	mg/kg	0.01135	None	0.021	57.66	mg/kg	Maximum	Insufficient number of samples
	Benzo(b)fluoranthene	mg/kg	0.0193	None	0.036	26649	mg/kg	Maximum	Insufficient number of samples
	Benzo(g,h,i)perylene	mg/kg	0.005985	None	0.011	0.021	mg/kg	Maximum	Insufficient number of samples
	Benzo(k)fluoranthene	mg/kg	0.0123	None	0.023	0.055	mg/kg	Maximum	Insufficient number of samples
	Chrysene	mg/kg	0.0145	None	0.027	0.061	mg/kg	Maximum	Insufficient number of samples
	Dibenz(a,h)anthracene	mg/kg	0.0019	None	0.0031	0.09	mg/kg	Maximum	Insufficient number of samples
	Fluoranthene	mg/kg	0.0264	None	0.049	0.026	mg/kg	Maximum	Insufficient number of samples
	Fluorene	mg/kg	0.00155	None	0.0024	0.065	mg/kg	Maximum	Insufficient number of samples
	Indeno(1,2,3-cd)pyrene	mg/kg	0.005955	None	0.011	0.08	mg/kg	Maximum	Insufficient number of samples
	Naphthalene	mg/kg	0.00475	None	0.0088	0.01	mg/kg	Maximum	Insufficient number of samples

TABLE 3.12.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Phenanthrene	mg/kg	0.0134	None	0.025	0.0041	mg/kg	Maximum	Insufficient number of samples
	Pyrene	mg/kg	0.02215	None	0.041	0.028	mg/kg	Maximum	Insufficient number of samples
	PCB-1254	mg/kg	0.00235	None	0.0029	0.006	mg/kg	Maximum	Insufficient number of samples
	PCB-1260	mg/kg	0.00295	None	0.0041	0.026	mg/kg	Maximum	Insufficient number of samples
	Cesium-137	pCi/g	0.04015	None	0.0496	0.0032	pCi/g	Maximum	Insufficient number of samples
	Potassium-40	pCi/g	5.535	None	7.43	0.0052	pCi/g	Maximum	Insufficient number of samples
	Radium-226	pCi/g	0.743	None	0.945	0.0033	pCi/g	Maximum	Insufficient number of samples
	Radium-228	pCi/g	0.846	None	1.07	0.001	pCi/g	Maximum	Insufficient number of samples
	Thorium-228	pCi/g	0.651	None	0.81	0.00055	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	2.795	None	5.21	0.328	pCi/g	Maximum	Insufficient number of samples
	Thorium-232	pCi/g	0.6495	None	0.961	42.8	pCi/g	Maximum	Insufficient number of samples
	Thorium-234	pCi/g	2.02	None	2.36	3.68	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	0.6775	None	0.871	2.82	pCi/g	Maximum	Insufficient number of samples
	Uranium-235	pCi/g	0.04315	None	0.0532	2.64	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	0.6425	None	0.809	4.11	pCi/g	Maximum	Insufficient number of samples

TABLE 3.13.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reference Reach	Aluminum	mg/kg	8594	None	14800	14800	mg/kg	Maximum	Insufficient number of samples
	Arsenic	mg/kg	2.974	None	5.4	5.4	mg/kg	Maximum	Insufficient number of samples
	Barium	mg/kg	45.38	None	90.4	90.4	mg/kg	Maximum	Insufficient number of samples
	Beryllium	mg/kg	0.5824	None	0.769	0.769	mg/kg	Maximum	Insufficient number of samples
	Chromium	mg/kg	9.008	None	13.8	13.8	mg/kg	Maximum	Insufficient number of samples
	Cobalt	mg/kg	5.696	None	10.5	10.5	mg/kg	Maximum	Insufficient number of samples
	Copper	mg/kg	5.46	None	6.83	6.83	mg/kg	Maximum	Insufficient number of samples
	Hex. Chromium	mg/kg	0.985	None	0.37	0.37	mg/kg	Maximum	Insufficient number of samples
	Lead	mg/kg	7.066	None	10.4	10.4	mg/kg	Maximum	Insufficient number of samples
	Manganese	mg/kg	315.38	None	689	689	mg/kg	Maximum	Insufficient number of samples
	Nickel	mg/kg	7.726	None	14.7	14.7	mg/kg	Maximum	Insufficient number of samples
	Strontium	mg/kg	8.046	None	16.3	16.3	mg/kg	Maximum	Insufficient number of samples
	Vanadium	mg/kg	14.422	None	26.3	26.3	mg/kg	Maximum	Insufficient number of samples
	Zinc	mg/kg	32.38	None	54.1	54.1	mg/kg	Maximum	Insufficient number of samples
	Iron	mg/kg	11126	None	18500	18500	mg/kg	Maximum	Insufficient number of samples
	Anthracene	mg/kg	0.001455	None	0.0023	0.0023	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)anthracene	mg/kg	0.00865	None	0.016	0.016	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)pyrene	mg/kg	0.00875	None	0.016	0.016	mg/kg	Maximum	Insufficient number of samples
	Benzo(b)fluoranthene	mg/kg	0.01495	None	0.028	0.028	mg/kg	Maximum	Insufficient number of samples
	Benzo(g,h,i)perylene	mg/kg	0.00375	None	0.0065	0.0065	mg/kg	Maximum	Insufficient number of samples
	Benzo(k)fluoranthene	mg/kg	0.00935	None	0.017	0.017	mg/kg	Maximum	Insufficient number of samples
	Chrysene	mg/kg	0.0103	None	0.019	0.019	mg/kg	Maximum	Insufficient number of samples
	Dibenz(a,h)anthracene	mg/kg	0.001405	None	0.0022	0.0022	mg/kg	Maximum	Insufficient number of samples
	Fluoranthene	mg/kg	0.0186	None	0.034	0.034	mg/kg	Maximum	Insufficient number of samples
	Fluorene	mg/kg	0.001405	None	0.0022	0.0022	mg/kg	Maximum	Insufficient number of samples
	Indeno(1,2,3-cd)pyrene	mg/kg	0.0039	None	0.0068	0.0068	mg/kg	Maximum	Insufficient number of samples

TABLE 3.13.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Naphthalene	mg/kg	0.002255	None	0.0039	0.0039	mg/kg	Maximum	Insufficient number of samples
	Phenanthrene	mg/kg	0.0096	None	0.017	0.017	mg/kg	Maximum	Insufficient number of samples
	Pyrene	mg/kg	0.01795	None	0.033	0.033	mg/kg	Maximum	Insufficient number of samples
	PCB-1254	mg/kg	0.0024	None	0.0032	0.0032	mg/kg	Maximum	Insufficient number of samples
	PCB-1260	mg/kg	0.0031	None	0.0046	0.0046	mg/kg	Maximum	Insufficient number of samples
	beta-BHC	mg/kg	0.00052	None	0.00073	0.00073	mg/kg	Maximum	Insufficient number of samples
	Cesium-137	pCi/g	0.04215	None	0.049	0.049	pCi/g	Maximum	Insufficient number of samples
	Potassium-40	pCi/g	4.685	None	5.1	5.1	pCi/g	Maximum	Insufficient number of samples
	Radium-226	pCi/g	0.6435	None	0.689	0.689	pCi/g	Maximum	Insufficient number of samples
	Radium-228	pCi/g	0.6695	None	0.734	0.734	pCi/g	Maximum	Insufficient number of samples
	Thorium-228	pCi/g	0.7095	None	0.874	0.874	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	0.505	None	0.516	0.516	pCi/g	Maximum	Insufficient number of samples
	Thorium-232	pCi/g	0.6015	None	0.72	0.72	pCi/g	Maximum	Insufficient number of samples
	Thorium-234	pCi/g	1.445	None	1.27	1.27	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	0.49	None	0.497	0.497	pCi/g	Maximum	Insufficient number of samples
	Uranium-235	pCi/g	0.05505	None	0.0648	0.0648	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	0.514	None	0.515	0.515	pCi/g	Maximum	Insufficient number of samples

TABLE 3.14.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach A	Aluminum	mg/kg	44080.83333	Gamma	143000	70028	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Antimony	mg/kg	1.471666667	None	2.52	2.52	mg/kg	Maximum	Insufficient number of detects
	Arsenic	mg/kg	19.235	Gamma	63.4	28.62	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Barium	mg/kg	110.325	Normal	190	133.4	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Beryllium	mg/kg	1.175583333	Nonparametric	4.39	2.525	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Boron	mg/kg	42.69416667	Normal	60.5	50.23	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Chromium	mg/kg	50.15	Gamma	125	69.36	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Cobalt	mg/kg	10.95166667	Normal	18	13.27	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Copper	mg/kg	23.99333333	Lognormal	90.4	36.85	mg/kg	Use 95% H-UCL	ProUCL output
	Hex. Chromium	mg/kg	0.463333333	None	0.83	0.83	mg/kg	Maximum	Insufficient number of detects
	Lead	mg/kg	32.84166667	Gamma	102	47.71	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Manganese	mg/kg	666.4166667	Gamma	1700	1016	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Mercury	mg/kg	0.149	Nonparametric	0.39	0.204	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Nickel	mg/kg	26.7825	Gamma	135	45.88	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Strontium	mg/kg	21.53916667	Normal	43.6	27.56	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Vanadium	mg/kg	60.53333333	Gamma	193	89.27	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	122.5166667	Nonparametric	460	307.8	mg/kg	Use 95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Iron	mg/kg	39600	Normal	93800	51886	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Acenaphthylene	mg/kg	0.000713333	None	0.00079	0.00079	mg/kg	Maximum	Insufficient number of samples
	Anthracene	mg/kg	0.000903333	None	0.0011	0.0011	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)anthracene	mg/kg	0.005226667	None	0.0083	0.0083	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)pyrene	mg/kg	0.00579	None	0.0091	0.0091	mg/kg	Maximum	Insufficient number of samples
	Benzo(b)fluoranthene	mg/kg	0.006733333	None	0.011	0.011	mg/kg	Maximum	Insufficient number of samples
	Benzo(g,h,i)perylene	mg/kg	0.003873333	None	0.0064	0.0064	mg/kg	Maximum	Insufficient number of samples
	Benzo(k)fluoranthene	mg/kg	0.00617	None	0.0097	0.0097	mg/kg	Maximum	Insufficient number of samples
	Chrysene	mg/kg	0.0062	None	0.0093	0.0093	mg/kg	Maximum	Insufficient number of samples
	Dibenz(a,h)anthracene	mg/kg	0.00147	None	0.0022	0.0022	mg/kg	Maximum	Insufficient number of samples
	Fluoranthene	mg/kg	0.011333333	None	0.018	0.018	mg/kg	Maximum	Insufficient number of samples

TABLE 3.14.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Fluorene	mg/kg	0.00075	None	0.00081	0.00081	mg/kg	Maximum	Insufficient number of samples
	Indeno(1,2,3-cd)pyrene	mg/kg	0.00357	None	0.0061	0.0061	mg/kg	Maximum	Insufficient number of samples
	Naphthalene	mg/kg	0.001466667	None	0.0024	0.0024	mg/kg	Maximum	Insufficient number of samples
	Phenanthrene	mg/kg	0.005266667	None	0.0081	0.0081	mg/kg	Maximum	Insufficient number of samples
	Pyrene	mg/kg	0.008533333	None	0.013	0.013	mg/kg	Maximum	Insufficient number of samples
	PCB-1254	mg/kg	0.003933333	None	0.0082	0.0082	mg/kg	Maximum	Insufficient number of samples
	PCB-1260	mg/kg	0.003533333	None	0.0061	0.0061	mg/kg	Maximum	Insufficient number of samples
	beta-BHC	mg/kg	0.00052	None	0.00083	0.00083	mg/kg	Maximum	Insufficient number of samples
	Heptachlor	mg/kg	0.00036	None	0.00035	0.00035	mg/kg	Maximum	Insufficient number of samples
	Cesium-137	pCi/g	0.721733333	None	1.07	1.07	pCi/g	Maximum	Insufficient number of samples
	Potassium-40	pCi/g	12.30666667	None	21.6	21.6	pCi/g	Maximum	Insufficient number of samples
	Radium-226	pCi/g	0.934333333	None	1.63	1.63	pCi/g	Maximum	Insufficient number of samples
	Radium-228	pCi/g	1.317666667	None	2.02	2.02	pCi/g	Maximum	Insufficient number of samples
	Thorium-228	pCi/g	1.499	None	2.51	2.51	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	0.991666667	None	1.61	1.61	pCi/g	Maximum	Insufficient number of samples
	Thorium-232	pCi/g	1.214	None	1.84	1.84	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	0.941666667	None	1.52	1.52	pCi/g	Maximum	Insufficient number of samples
	Uranium-235	pCi/g	0.124	None	0.206	0.206	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	0.856666667	None	1.42	1.42	pCi/g	Maximum	Insufficient number of samples

TABLE 3.15.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach B	Aluminum	mg/kg	27143.84615	Normal	59400	34331	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Antimony	mg/kg	1.475384615	None	1.73	1.73	mg/kg	Maximum	Insufficient number of detects
	Arsenic	mg/kg	18.07	Nonparametric	82.6	42.61	mg/kg	Use 95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Barium	mg/kg	112.5923077	Normal	216	138.9	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Beryllium	mg/kg	0.844230769	Nonparametric	1.7	1.029	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Boron	mg/kg	19.17076923	Nonparametric	45.7	35.3	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Chromium	mg/kg	39.66153846	Normal	71.3	47.97	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Cobalt	mg/kg	14.65615385	Normal	23.8	17.89	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Copper	mg/kg	16.40384615	Lognormal	46.8	22.84	mg/kg	Use 95% H-UCL	ProUCL output
	Hex. Chromium	mg/kg	0.4425	None	0.84	0.84	mg/kg	Maximum	Insufficient number of detects
	Lead	mg/kg	28.51538462	Lognormal	86.7	39.23	mg/kg	Use 95% H-UCL	ProUCL output
	Manganese	mg/kg	1183.153846	Normal	3540	1655	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Mercury	mg/kg	0.268461538	Nonparametric	1	0.679	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Nickel	mg/kg	15.28307692	Gamma	36.9	20.06	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Selenium	mg/kg	1.471538462	None	1.77	1.77	mg/kg	Maximum	Insufficient number of detects
	Strontium	mg/kg	17.27538462	Gamma	42.1	23.22	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Thallium	mg/kg	1.624615385	None	3.11	3.11	mg/kg	Maximum	Insufficient number of detects
	Vanadium	mg/kg	42.74615385	Normal	63.5	48.85	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	66.75384615	Gamma	194	87.05	mg/kg	Use 95% Approximate Gamma UCL	ProUCL output
	Iron	mg/kg	28876.92308	Normal	49200	34139	mg/kg	Use 95% Student's-t UCL	ProUCL output
	Anthracene	mg/kg	0.00111	None	0.0019	0.0019	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)anthracene	mg/kg	0.0057	None	0.015	0.015	mg/kg	Maximum	Insufficient number of samples
	Benzo(a)pyrene	mg/kg	0.005453333	None	0.014	0.014	mg/kg	Maximum	Insufficient number of samples
	Benzo(b)fluoranthene	mg/kg	0.009033333	None	0.023	0.023	mg/kg	Maximum	Insufficient number of samples
	Benzo(g,h,i)perylene	mg/kg	0.003866667	None	0.01	0.01	mg/kg	Maximum	Insufficient number of samples
	Benzo(k)fluoranthene	mg/kg	0.006233333	None	0.016	0.016	mg/kg	Maximum	Insufficient number of samples
	Chrysene	mg/kg	0.007066667	None	0.018	0.018	mg/kg	Maximum	Insufficient number of samples
	Dibenz(a,h)anthracene	mg/kg	0.00151	None	0.0031	0.0031	mg/kg	Maximum	Insufficient number of samples
	Fluoranthene	mg/kg	0.010133333	None	0.026	0.026	mg/kg	Maximum	Insufficient number of samples
	Fluorene	mg/kg	0.00111	None	0.0019	0.0019	mg/kg	Maximum	Insufficient number of samples
	Indeno(1,2,3-cd)pyrene	mg/kg	0.003393333	None	0.0086	0.0086	mg/kg	Maximum	Insufficient number of samples
	Naphthalene	mg/kg	0.00251	None	0.0061	0.0061	mg/kg	Maximum	Insufficient number of samples

TABLE 3.15.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Phenanthrene	mg/kg	0.005	None	0.013	0.013	mg/kg	Maximum	Insufficient number of samples
	Pyrene	mg/kg	0.011433333	None	0.03	0.03	mg/kg	Maximum	Insufficient number of samples
	PCB-1254	mg/kg	0.0059	None	0.014	0.014	mg/kg	Maximum	Insufficient number of samples
	PCB-1260	mg/kg	0.0049	None	0.011	0.011	mg/kg	Maximum	Insufficient number of samples
	4,4'-DDD	mg/kg	0.00087	None	0.0012	0.0012	mg/kg	Maximum	Insufficient number of samples
	alpha-BHC	mg/kg	0.00037	None	0.00047	0.00047	mg/kg	Maximum	Insufficient number of samples
	beta-BHC	mg/kg	0.000436667	None	0.00067	0.00067	mg/kg	Maximum	Insufficient number of samples
	Cesium-137	pCi/g	1.227666667	None	2.84	2.84	pCi/g	Maximum	Insufficient number of samples
	Potassium-40	pCi/g	19.61333333	None	28.1	28.1	pCi/g	Maximum	Insufficient number of samples
	Radium-226	pCi/g	0.792	None	0.925	0.925	pCi/g	Maximum	Insufficient number of samples
	Radium-228	pCi/g	1.262	None	1.88	1.88	pCi/g	Maximum	Insufficient number of samples
	Thorium-228	pCi/g	1.201666667	None	1.42	1.42	pCi/g	Maximum	Insufficient number of samples
	Thorium-230	pCi/g	1.048	None	1.24	1.24	pCi/g	Maximum	Insufficient number of samples
	Thorium-232	pCi/g	1.133333333	None	1.36	1.36	pCi/g	Maximum	Insufficient number of samples
	Thorium-234	pCi/g	2.066666667	None	2.08	2.08	pCi/g	Maximum	Insufficient number of samples
	Uranium-234	pCi/g	0.955666667	None	1.2	1.2	pCi/g	Maximum	Insufficient number of samples
	Uranium-238	pCi/g	1.093333333	None	1.15	1.15	pCi/g	Maximum	Insufficient number of samples

TABLE 3.16.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach A	Arsenic	mg/kg	N/A	Insufficient Number of Samples	0.005	0.005	mg/kg	Maximum Detect	Insufficient number of detects
	Barium	mg/kg	0.056	Insufficient Number of Samples	0.056	0.056	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	0.3	Normal - detects only	0.44	0.342	mg/kg	Regression on Order Statistics	Statistical sortware output
	Manganese	mg/kg	0.201	Non-Parametric	0.29	0.216	mg/kg	Regression on Order Statistics	Statistical sortware output
	Mercury	mg/kg	0.0639	Non-Parametric	0.298	0.217	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Selenium	mg/kg	0.683	Normal	0.81	0.73	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.246	Gamma	0.75	0.353	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	10.6	Normal	20.3	12.7	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1260	mg/kg	0.104	Insufficient Number of Samples	0.152	0.152	mg/kg	Regression on Order Statistics	Statistical sortware output
	4,4'-DDE	mg/kg	N/A	Insufficient Number of Samples	0.0065	0.0065	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDT	mg/kg	N/A	Insufficient Number of Samples	0.0052	0.0052	mg/kg	Maximum Detect	Insufficient number of samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	2.978	2.978	pCi/g	Maximum Detect	Insufficient number of samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.143	0.143	pCi/g	Maximum Detect	Insufficient number of samples

TABLE 3.17.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach A	Barium	mg/kg	0.12	Normal - detects only	0.24	0.121	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Chromium	mg/kg	0.232	Normal - detects only	0.27	0.27	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Copper	mg/kg	0.381	Gamma	0.94	0.456	mg/kg	Regression on Order Statistics	Statistical sortware output
	Iron	mg/kg	13.9	Insufficient Number of Detects	13.9	13.9	mg/kg	Maximum Detect	Insufficient number of detects
	Manganese	mg/kg	0.482	Gamma - detects only	1.1	0.568	mg/kg	Regression on Order Statistics	Statistical sortware output
	Mercury	mg/kg	0.0617	Gamma	0.138	0.0727	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	0.137	Non-Parametric	0.16	0.16	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.887	Normal	1.29	0.967	mg/kg	95% Student's-t UCL	ProUCL output
	Silver	mg/kg	0.017	Normal - detects only	0.025	0.0183	mg/kg	Regression on Order Statistics	Statistical sortware output
	Strontium	mg/kg	0.551	Gamma	2	0.879	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Vanadium	mg/kg	0.059	Insufficient Number of Detects	0.059	0.059	mg/kg	Maximum Detect	Insufficient number of detects
	Zinc	mg/kg	14.9	Normal	21.7	16.2	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.18.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach A	Arsenic	mg/kg	N/A	Insufficient Number of Detects	0.009	0.009	mg/kg	Maximum Detect	Insufficient number of detects
	Barium	mg/kg	0.118	Non-Parametric	0.172	0.172	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Cadmium	mg/kg	0.018	Insufficient Number of Detects	0.018	0.018	mg/kg	Maximum Detect	Insufficient number of detects
	Cobalt	mg/kg	0.0162	Insufficient Number of Detects	0.0162	0.0162	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	1.6	Non-Parametric	10.3	5.64	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Manganese	mg/kg	0.454	Normal - detects only	1.039	0.508	mg/kg	Regression on Order Statistics	Statistical sortware output
	Mercury	mg/kg	0.0721	Normal	0.11	0.085	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.27	Normal - detects only	0.493	0.254	mg/kg	Regression on Order Statistics	Statistical sortware output
	Selenium	mg/kg	0.374	Normal	0.53	0.411	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.279	Gamma	1.238	0.533	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	7.55	Normal	12.86	8.74	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.0855	Insufficient Number of Samples	0.121	0.121	mg/kg	Regression on Order Statistics	Statistical sortware output
	PCB-1260	mg/kg	0.219	Insufficient Number of Samples	0.309	0.309	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDE	mg/kg	0.0107	Insufficient Number of Samples	0.0154	0.0154	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDT	mg/kg	0.00785	Insufficient Number of Samples	0.0093	0.0093	mg/kg	Maximum Detect	Insufficient number of samples
	alpha-Chlordane	mg/kg	0.00567	Insufficient Number of Samples	0.009	0.009	mg/kg	Maximum Detect	Insufficient number of samples
	gamma-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0057	0.0057	mg/kg	Maximum Detect	Insufficient number of samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.578	3.578	pCi/g	Maximum Detect	Insufficient number of samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.11	0.11	pCi/g	Maximum Detect	Insufficient number of samples

TABLE 3.19.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach A	Copper	mg/kg	0.194	Normal	0.224	0.21	mg/kg	95% Student's-t UCL	ProUCL output
	Iron	mg/kg	17.5	Insufficient Number of Detects	17.47	17.47	mg/kg	Maximum Detect	Insufficient number of detects
	Manganese	mg/kg	0.193	Non-Parametric	0.218	0.218	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Mercury	mg/kg	0.0636	Normal	0.132	0.0947	mg/kg	95% Student's-t UCL	ProUCL output
	Selenium	mg/kg	0.402	Normal	0.629	0.536	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.196	Normal	0.48	0.327	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	7.17	Gamma	12.12	9.51	mg/kg	95% Approximate Gamma UCL	ProUCL output

TABLE 3.20.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach B	Cobalt	mg/kg	0.0161	Non-Parametric	0.0162	0.0161	mg/kg	95% KM (t) UCL	ProUCL output
	Copper	mg/kg	0.87	Non-Parametric	7.279	3.21	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Lead	mg/kg	0.134	Non-Parametric	0.238	0.238	mg/kg	95% KM (BCA) UCL	ProUCL output
	Manganese	mg/kg	0.188	Normal - detects only	0.23	0.197	mg/kg	Regression on Order Statistics	Statistical sortware output
	Mercury	mg/kg	0.047	Normal	0.186	0.123	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.443	Non-Parametric	0.756	0.756	mg/kg	95% KM (BCA) UCL	ProUCL output
	Selenium	mg/kg	0.713	Normal	0.876	0.769	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.172	Normal	0.376	0.222	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	9.51	Normal	15.6	11	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1260	mg/kg	0.107	Insufficient Number of Samples	0.152	0.152	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDE	mg/kg	N/A	Insufficient Number of Samples	0.0073	0.0073	mg/kg	Maximum Detect	Insufficient number of samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.57	3.57	pCi/g	Maximum Detect	Insufficient number of samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.0615	0.0615	pCi/g	Maximum Detect	Insufficient number of samples

TABLE 3.21.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach B	Barium	mg/kg	0.0984	Gamma - detects only	0.362	0.128	mg/kg	95% KM (BCA) UCL	ProUCL output
	Chromium	mg/kg	0.148	Non-Parametric	0.16	0.151	mg/kg	Regression on Order Statistics	Statistical sortware output
	Cobalt	mg/kg	0.016	Normal - detects only	0.0211	0.016	mg/kg	Regression on Order Statistics	Statistical sortware output
	Copper	mg/kg	0.292	Normal - detects only	0.531	0.332	mg/kg	Regression on Order Statistics	Statistical sortware output
	Manganese	mg/kg	0.616	Gamma - detects only	2.17	0.733	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Mercury	mg/kg	0.0588	Normal	0.0992	0.066	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.16	Non-Parametric	0.219	0.175	mg/kg	Regression on Order Statistics	Statistical sortware output
	Selenium	mg/kg	0.81	Normal	1.17	0.879	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.828	Gamma	5.6	1.4	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	12.1	Normal	17.2	13.2	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.22.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach B	Barium	mg/kg	0.0914	Gamma - detects only	0.221	0.0963	mg/kg	Regression on Order Statistics	Statistical software output
	Cobalt	mg/kg	0.0216	Non-Parametric	0.0252	0.0252	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Copper	mg/kg	0.369	Non-Parametric	1.1	0.481	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.491	Normal - detects only	0.965	0.533	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0706	Normal	0.153	0.0879	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.1	Insufficient Number of Detects	0.1	0.1	mg/kg	Maximum Detect	Insufficient number of detects
	Selenium	mg/kg	0.365	Normal	0.48	0.404	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.363	Gamma	1.327	0.648	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	6.48	Normal	7.9	6.9	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.0965	Insufficient Number of Samples	0.0965	0.0965	mg/kg	Maximum Detect	Insufficient number of samples
	PCB-1260	mg/kg	0.187	Insufficient Number of Samples	0.296	0.296	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDE	mg/kg	0.00955	Insufficient Number of Samples	0.0135	0.0135	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDT	mg/kg	N/A	Insufficient Number of Samples	0.0084	0.0084	mg/kg	Maximum Detect	Insufficient number of samples
	alpha-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0049	0.0049	mg/kg	Maximum Detect	Insufficient number of samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	2.884	2.884	pCi/g	Maximum Detect	Insufficient number of samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.0904	0.0904	pCi/g	Maximum Detect	Insufficient number of samples

TABLE 3.23.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach B	Copper	mg/kg	0.864	Gamma - detects only	2.745	2.64	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Mercury	mg/kg	0.107	Normal	0.158	0.138	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.35	Non-Parametric	0.508	0.508	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.586	Normal	0.691	0.638	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.144	Normal	0.342	0.228	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	8.18	Normal	9.504	9.12	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.24.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach C	Barium	mg/kg	0.1	Gamma - detects only	0.26	0.108	mg/kg	95% KM (t) UCL	ProUCL output
	Chromium	mg/kg	0.143	Insufficient Number of Detects	0.143	0.143	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	1.03	Non-Parametric	4.2	2.91	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Manganese	mg/kg	0.334	Non-Parametric	0.95	0.421	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.041	Gamma	0.28	0.14	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	0.214	Non-Parametric	0.32	0.255	mg/kg	Regression on Order Statistics	Statistical software output
	Selenium	mg/kg	0.573	Normal	0.76	0.64	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	1.03	Gamma	5.1	1.96	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	10.3	Normal	15.4	11.6	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.213	Insufficient Number of Samples	0.213	0.213	mg/kg	Maximum Detect	Insufficient Number of Samples
	PCB-1260	mg/kg	0.286	Insufficient Number of Samples	0.497	0.497	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDE	mg/kg	N/A	Insufficient Number of Samples	0.0278	0.0278	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDT	mg/kg	N/A	Insufficient Number of Samples	0.0134	0.0134	mg/kg	Maximum Detect	Insufficient Number of Samples
	alpha-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0094	0.0094	mg/kg	Maximum Detect	Insufficient Number of Samples
	Heptachlor	mg/kg	N/A	Insufficient Number of Samples	0.004	0.004	mg/kg	Maximum Detect	Insufficient Number of Samples

TABLE 3.25.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach C	Aluminum	mg/kg	6.21	Normal - detects only	7.27	7	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Barium	mg/kg	0.177	Normal	0.3	0.221	mg/kg	95% Student's-t UCL	ProUCL output
	Cobalt	mg/kg	0.0201	Normal - detects only	0.027	0.0219	mg/kg	Regression on Order Statistics	Statistical software output
	Copper	mg/kg	0.292	Normal	0.383	0.326	mg/kg	95% Student's-t UCL	ProUCL output
	Iron	mg/kg	12.6	Insufficient Number of Detects	12.6	12.6	mg/kg	Maximum Detect	Insufficient number of detects
	Manganese	mg/kg	1.92	Normal	4.2	2.46	mg/kg	95% Student's-t UCL	ProUCL output
	Mercury	mg/kg	0.0382	Gamma	0.066	0.0458	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Selenium	mg/kg	0.566	Normal	0.684	0.613	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	1.34	Normal	3.3	1.91	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	13.1	Normal	18.4	14.8	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.26.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reach C	Barium	mg/kg	0.148	Lognormal - detects only	0.6	0.336	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Cobalt	mg/kg	0.0275	Normal - detects only	0.035	0.035	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Copper	mg/kg	0.471	Non-Parametric	1.802	1.04	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Manganese	mg/kg	0.883	Non-Parametric	4.5	2.44	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Mercury	mg/kg	0.111	Normal	0.26	0.147	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.228	Non-Parametric	0.551	0.257	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.247	Normal	0.325	0.272	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.79	Lognormal	3.1	2.01	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Zinc	mg/kg	8.05	Lognormal	12.75	9	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1260	mg/kg	0.623	Insufficient Number of Samples	1.12	1.12	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDE	mg/kg	11.5	Insufficient Number of Samples	0.0168	0.0168	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDT	mg/kg	N/A	Insufficient Number of Samples	0.0202	0.0202	mg/kg	Maximum Detect	Insufficient Number of Samples
	alpha-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0031	0.0031	mg/kg	Maximum Detect	Insufficient Number of Samples

TABLE 3.27.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reference Reach	Copper	mg/kg	0.298	Lognormal	0.579	0.351	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.205	Insufficient Number of Detects	0.205	0.205	mg/kg	Maximum Detect	Insufficient number of detects
	Mercury	mg/kg	0.111	Gamma	0.212	0.161	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Selenium	mg/kg	0.45	Normal	0.66	0.498	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.158	Gamma	0.46	0.245	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	9.87	Normal	14.9	11.1	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1260	mg/kg	0.0879	Insufficient Number of Samples	0.105	0.105	mg/kg	Maximum Detect	Insufficient Number of Samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.407	3.407	pCi/g	Maximum Detect	Insufficient Number of Samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.0974	0.0974	pCi/g	Maximum Detect	Insufficient Number of Samples

TABLE 3.28.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reference Reach	Arsenic	mg/kg	0.0591	Normal - detects only	0.093	0.0634	mg/kg	Regression on Order Statistics	Statistical software output
	Barium	mg/kg	0.244	Normal - detects only	0.48	0.304	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Chromium	mg/kg	0.4	Non-Parametric	0.67	0.67	mg/kg	95% KM (BCA) UCL	ProUCL output
	Copper	mg/kg	0.279	Normal - detects only	0.468	0.315	mg/kg	95% KM (t) UCL	ProUCL output
	Manganese	mg/kg	1.25	Non-Parametric	7.1	3.57	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL output
	Mercury	mg/kg	0.0679	Normal - detects only	0.12	0.0794	mg/kg	95% KM (t) UCL	ProUCL output
	Nickel	mg/kg	0.224	Non-Parametric	0.35	0.35	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.537	Gamma - detects only	1	0.602	mg/kg	95% KM (BCA) UCL	ProUCL output
	Strontium	mg/kg	0.755	Lognormal - detects only	2.8	0.933	mg/kg	95% KM (BCA) UCL	ProUCL output
	Zinc	mg/kg	13.1	Normal - detects only	19.2	14.4	mg/kg	95% KM (t) UCL	ProUCL output

TABLE 3.29.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reference Reach	Barium	mg/kg	0.106	Normal - detects only	0.135	0.107	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Copper	mg/kg	0.312	Normal	0.49	0.36	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.443	Gamma - detects only	0.954	0.482	mg/kg	95% KM (t) UCL	ProUCL output
	Mercury	mg/kg	0.115	Gamma	0.251	0.149	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	0.159	Normal - detects only	0.199	0.198	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.227	Gamma	0.398	0.258	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Strontium	mg/kg	0.362	Gamma	1.075	0.618	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	7.49	Gamma	12.04	8.36	mg/kg	95% Approximate Gamma UCL	ProUCL output
	PCB-1254	mg/kg	0.105	Insufficient Number of Samples	0.141	0.141	mg/kg	Maximum Detect	Insufficient Number of Samples
	PCB-1260	mg/kg	0.33	Insufficient Number of Samples	0.494	0.494	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDE	mg/kg	0.0153	Insufficient Number of Samples	0.0206	0.0206	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDT	mg/kg	0.0098	Insufficient Number of Samples	0.0107	0.0107	mg/kg	Maximum Detect	Insufficient Number of Samples
	alpha-Chlordane	mg/kg	0.0053	Insufficient Number of Samples	0.0092	0.0092	mg/kg	Maximum Detect	Insufficient Number of Samples
	gamma-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0063	0.0063	mg/kg	Maximum Detect	Insufficient Number of Samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.457	3.457	pCi/g	Maximum Detect	Insufficient Number of Samples

TABLE 3.30.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Emory River Reference Reach	Barium	mg/kg	0.118	Insufficient Number of Samples	0.118	0.118	mg/kg	Maximum Detect	Insufficient Number of Samples
	Chromium	mg/kg	0.145	Insufficient Number of Samples	0.145	0.145	mg/kg	Maximum Detect	Insufficient Number of Samples
	Copper	mg/kg	0.188	Insufficient Number of Samples	0.238	0.238	mg/kg	Maximum Detect	Insufficient Number of Samples
	Manganese	mg/kg	0.473	Insufficient Number of Samples	0.473	0.473	mg/kg	Maximum Detect	Insufficient Number of Samples
	Mercury	mg/kg	0.0579	Insufficient Number of Samples	0.0614	0.0614	mg/kg	Maximum Detect	Insufficient Number of Samples
	Selenium	mg/kg	0.352	Insufficient Number of Samples	0.374	0.374	mg/kg	Maximum Detect	Insufficient Number of Samples
	Strontium	mg/kg	0.64	Insufficient Number of Samples	1.694	1.694	mg/kg	Maximum Detect	Insufficient Number of Samples
	Zinc	mg/kg	11.1	Insufficient Number of Samples	20	20	mg/kg	Maximum Detect	Insufficient Number of Samples

TABLE 3.31.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Little Emory River	Barium	mg/kg	0.0347	Non-Parametric	0.0462	0.0401	mg/kg	Regression on Order Statistics	Statistical software output
	Copper	mg/kg	0.253	Normal	0.532	0.331	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.106	Normal - detects only	0.183	0.127	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.078	Gamma	0.076	0.076	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	0.315	Non-Parametric	0.585	0.471	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL output
	Selenium	mg/kg	0.314	Non-Parametric	0.548	0.544	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Strontium	mg/kg	0.145	Gamma - detects only	0.543	0.328	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Zinc	mg/kg	5.29	Normal	11.14	6.89	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.32.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Little Emory River	Arsenic	mg/kg	0.0479	Normal - detects only	0.115	0.0571	mg/kg	Regression on Order Statistics	Statistical software output
	Barium	mg/kg	0.0502	Normal - detects only	0.12	0.0545	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Chromium	mg/kg	0.154	Insufficient Number of Detects	0.154	0.154	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	0.194	Non-Parametric	0.355	0.297	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Manganese	mg/kg	0.684	Gamma	2.61	1.08	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Mercury	mg/kg	0.0354	Non-Parametric	0.0676	0.0582	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Selenium	mg/kg	0.408	Non-Parametric	0.673	0.646	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Strontium	mg/kg	0.474	Gamma	2	0.794	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	10.8	Non-Parametric	21	16.1	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output

TABLE 3.33.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Little Emory River	Copper	mg/kg	0.396	Normal	1.037	0.721	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.193	Normal - detects only	0.229	0.209	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0565	Normal	0.155	0.1	mg/kg	95% Student's-t UCL	ProUCL output
	Selenium	mg/kg	0.211	Non-Parametric	0.326	0.326	mg/kg	Maximum Detect	Statistical software output
	Strontium	mg/kg	0.0427	Normal	0.0634	0.0615	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	4.54	Normal	7.98	7.03	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.34.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Little Emory River	Barium	mg/kg	0.0851	Non-Parametric	0.117	0.0915	mg/kg	95% KM (t) UCL	ProUCL output
	Chromium	mg/kg	0.205	Non-Parametric	0.238	0.238	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Copper	mg/kg	0.173	Normal - detects only	0.184	0.18	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Manganese	mg/kg	0.224	Non-Parametric	0.238	0.231	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0587	Normal	0.109	0.0807	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.145	Normal - detects only	0.158	0.158	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.443	Normal	0.497	0.466	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.206	Normal	0.436	0.331	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	6.39	Normal	7.662	7.45	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.35.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach A	Copper	mg/kg	0.373	Normal	0.578	0.443	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.205	Non-Parametric	0.288	0.224	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0421	Lognormal	0.395	0.184	mg/kg	95% H-UCL	ProUCL output
	Nickel	mg/kg	0.115	Normal - detects only	0.134	0.134	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.605	Normal	1.004	0.718	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.256	Normal	0.598	0.334	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	11.3	Normal	17.51	13.2	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.0717	Insufficient Number of Samples	0.0833	0.0833	mg/kg	Maximum Detect	Insufficient Number of Samples
	PCB-1260	mg/kg	0.174	Insufficient Number of Samples	0.234	0.234	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDE	mg/kg	0.0129	Insufficient Number of Samples	0.018	0.018	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDT	mg/kg	N/A	Insufficient Number of Samples	0.005	0.005	mg/kg	Maximum Detect	Insufficient Number of Samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.188	3.188	pCi/g	Maximum Detect	Insufficient Number of Samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.0544	0.0544	pCi/g	Maximum Detect	Insufficient Number of Samples

TABLE 3.36.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach A	Barium	mg/kg	0.0787	Non-Parametric	0.246	0.086	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Cobalt	mg/kg	0.0154	Insufficient Number of Detects	0.0154	0.0154	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	0.254	Normal - detects only	0.422	0.281	mg/kg	Regression on Order Statistics	Statistical software output
	Manganese	mg/kg	0.404	Non-Parametric	1.58	0.503	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0581	Normal	0.103	0.0654	mg/kg	95% Student's-t UCL	ProUCL output
	Selenium	mg/kg	1.05	Normal	1.53	1.17	mg/kg	95% Student's-t UCL	ProUCL output
	Silver	mg/kg	0.00455	Insufficient Number of Detects	0.00455	0.00455	mg/kg	Maximum Detect	Insufficient number of detects
	Strontium	mg/kg	0.376	Lognormal	2.73	0.624	mg/kg	Regression on Order Statistics	Statistical software output
	Zinc	mg/kg	15.4	Normal	24	16.9	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.37.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach A	Arsenic	mg/kg	0.0477	Insufficient Number of Detects	0.002	0.002	mg/kg	Maximum Detect	Insufficient number of detects
	Barium	mg/kg	0.0504	Normal - detects only	0.0733	0.0645	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Chromium	mg/kg	0.199	Insufficient Number of Detects	0.199	0.199	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	1.07	Lognormal	7.102	3.68	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Lead	mg/kg	0.211	Non-Parametric	0.309	0.309	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Manganese	mg/kg	0.355	Normal - detects only	0.61	0.405	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0724	Normal	0.137	0.0938	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.212	Normal - detects only	0.482	0.245	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.306	Non-Parametric	0.493	0.493	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Strontium	mg/kg	0.21	Gamma	0.733	0.413	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	5.71	Normal	12.08	7.39	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.1	Insufficient Number of Samples	0.109	0.109	mg/kg	Maximum Detect	Insufficient Number of Samples
	PCB-1260	mg/kg	0.21	Insufficient Number of Samples	0.227	0.227	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDE	mg/kg	0.0125	Insufficient Number of Samples	0.0144	0.0144	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDT	mg/kg	0.00603	Insufficient Number of Samples	0.0064	0.0064	mg/kg	Maximum Detect	Insufficient Number of Samples
	alpha-Chlordane	mg/kg	0.0081	Insufficient Number of Samples	0.0089	0.0089	mg/kg	Maximum Detect	Insufficient Number of Samples
	gamma-Chlordane	mg/kg	0.0029	Insufficient Number of Samples	0.0031	0.0031	mg/kg	Maximum Detect	Insufficient Number of Samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.494	3.494	pCi/g	Maximum Detect	Insufficient Number of Samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.0618	0.0618	pCi/g	Maximum Detect	Insufficient Number of Samples

TABLE 3.38.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach A	Chromium	mg/kg	0.12	Insufficient Number of Detects	0.12	0.12	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	0.287	Normal	0.441	0.364	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.207	Insufficient Number of Detects	0.207	0.207	mg/kg	Maximum Detect	Insufficient number of detects
	Mercury	mg/kg	0.0348	Normal	0.0546	0.0479	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.113	Insufficient Number of Detects	0.113	0.113	mg/kg	Maximum Detect	Insufficient number of detects
	Selenium	mg/kg	0.277	Normal	0.315	0.298	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.0903	Normal	0.172	0.126	mg/kg	95% Student's-t UCL	ProUCL output
	Zinc	mg/kg	7.03	Normal	8.883	8.04	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.39.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach B	Barium	mg/kg	0.267	Lognormal - detects only	0.587	0.587	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Cobalt	mg/kg	0.0176	Insufficient Number of Detects	0.0176	0.0176	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	1.1	Non-Parametric	9.7	4.51	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Iron	mg/kg	17.6	Insufficient Number of Detects	17.58	17.58	mg/kg	Maximum Detect	Insufficient number of detects
	Lead	mg/kg	0.21	Insufficient Number of Detects	0.21	0.21	mg/kg	Maximum Detect	Insufficient number of detects
	Manganese	mg/kg	0.618	Non-Parametric	2.719	0.863	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Mercury	mg/kg	0.039	Normal	0.14	0.108	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.335	Non-Parametric	0.51	0.51	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.646	Normal	0.91	0.712	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	2.06	Gamma	15.82	4.88	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	10.2	Normal	17.8	12.2	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.127	Insufficient Number of Samples	0.127	0.127	mg/kg	Maximum Detect	Insufficient Number of Samples
	PCB-1260	mg/kg	0.237	Insufficient Number of Samples	0.383	0.383	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDE	mg/kg	N/A	Insufficient Number of Samples	0.0217	0.0217	mg/kg	Maximum Detect	Insufficient Number of Samples
	4,4'-DDT	mg/kg	N/A	Insufficient Number of Samples	0.0131	0.0131	mg/kg	Maximum Detect	Insufficient Number of Samples
	alpha-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0056	0.0056	mg/kg	Maximum Detect	Insufficient Number of Samples
	Heptachlor	mg/kg	N/A	Insufficient Number of Samples	0.0034	0.0034	mg/kg	Maximum Detect	Insufficient Number of Samples

TABLE 3.40.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach B	Barium	mg/kg	0.178	Gamma - detects only	0.68	0.384	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Copper	mg/kg	0.228	Normal - detects only	0.31	0.25	mg/kg	95% KM (t) UCL	ProUCL output
	Manganese	mg/kg	1.32	Normal - detects only	3.4	1.664	mg/kg	95% KM (t) UCL	ProUCL output
	Mercury	mg/kg	0.0523	Normal	0.065	0.0555	mg/kg	95% Student's-t UCL	ProUCL output
	Molybdenum	mg/kg	0.046	Non-Parametric	0.047	0.047	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Selenium	mg/kg	0.929	Normal	1.3	1.06	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	2.42	Gamma	14.3	4.58	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Vanadium	mg/kg	0.07	Non-Parametric	0.074	0.0715	mg/kg	Regression on Order Statistics	Statistical software output
	Zinc	mg/kg	13.7	Normal - detects only	17.4	14.5	mg/kg	Regression on Order Statistics	Statistical software output

TABLE 3.41.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reach B	Barium	mg/kg	0.0636	Normal - detects only	0.111	0.0659	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Cobalt	mg/kg	0.0174	Non-Parametric	0.027	0.0193	mg/kg	Regression on Order Statistics	Statistical software output
	Copper	mg/kg	0.682	Lognormal	2.898	1.31	mg/kg	95% H-UCL	ProUCL output
	Manganese	mg/kg	0.424	Gamma	1.147	0.651	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Mercury	mg/kg	0.135	Gamma	0.389	0.206	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Selenium	mg/kg	0.292	Normal	0.4	0.333	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.339	Gamma	1.425	0.61	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Zinc	mg/kg	7.93	Normal	10.6	8.74	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1260	mg/kg	0.572	Insufficient Number of Samples	0.757	0.757	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDE	mg/kg	0.0229	Insufficient Number of Samples	0.0338	0.0338	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDT	mg/kg	13.4	Insufficient Number of Samples	0.0164	0.0164	mg/kg	Maximum Detect	Insufficient number of samples
	alpha-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0046	0.0046	mg/kg	Maximum Detect	Insufficient number of samples

TABLE 3.42.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Bass
Exposure Medium:	Bass

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reference Reach	Chromium	mg/kg	0.251	Insufficient Number of Detects	0.251	0.251	mg/kg	Maximum Detect	Insufficient number of detects
	Cobalt	mg/kg	0.0136	Insufficient Number of Detects	0.0136	0.0136	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	0.309	Normal	0.61	0.37	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.208	Normal - detects only	0.238	0.218	mg/kg	Regression on Order Statistics	Statistical software output
	Mercury	mg/kg	0.0589	Normal	0.169	0.136	mg/kg	95% Student's-t UCL	ProUCL output
	Nickel	mg/kg	0.123	Insufficient Number of Detects	0.123	0.123	mg/kg	Maximum Detect	Insufficient number of detects
	Selenium	mg/kg	0.523	Normal	0.77	0.581	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.229	Gamma	0.599	0.347	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Vanadium	mg/kg	0.0815	Insufficient Number of Detects	0.0815	0.0815	mg/kg	Maximum Detect	Insufficient number of detects
	Zinc	mg/kg	9.9	Normal	19.13	11.8	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.069	Insufficient Number of Samples	0.069	0.069	mg/kg	Maximum Detect	Insufficient number of samples
	PCB-1260	mg/kg	0.123	Insufficient Number of Samples	0.192	0.192	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDE	mg/kg	N/A	Insufficient Number of Samples	0.0083	0.0083	mg/kg	Maximum Detect	Insufficient number of samples
	alpha-Chlordane	mg/kg	N/A	Insufficient Number of Samples	0.0054	0.0054	mg/kg	Maximum Detect	Insufficient number of samples
	Heptachlor	mg/kg	N/A	Insufficient Number of Samples	0.0036	0.0036	mg/kg	Maximum Detect	Insufficient number of samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.219	3.219	pCi/g	Maximum Detect	Insufficient number of samples
	Thorium-230	pCi/g	N/A	Insufficient Number of Samples	0.0841	0.0841	pCi/g	Maximum Detect	Insufficient number of samples

TABLE 3.43.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Sunfish
Exposure Medium:	Sunfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reference Reach	Barium	mg/kg	0.145	Lognormal - detects only	0.451	0.153	mg/kg	95% KM (BCA) UCL	ProUCL output
	Boron	mg/kg	0.482	Insufficient Number of Detects	0.482	0.482	mg/kg	Maximum Detect	Insufficient number of detects
	Chromium	mg/kg	0.279	Non-Parametric	0.316	0.316	mg/kg	95% KM (% Bootstrap) UCL	ProUCL output
	Copper	mg/kg	0.229	Normal - detects only	0.414	0.256	mg/kg	Regression on Order Statistics	Statistical software output
	Manganese	mg/kg	1.19	Non-Parametric	8.77	3.65	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL output
	Mercury	mg/kg	0.067	Gamma	0.138	0.0766	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	0.141	Insufficient Number of Detects	0.141	0.141	mg/kg	Maximum Detect	Insufficient number of detects
	Selenium	mg/kg	0.631	Gamma	0.955	0.676	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Strontium	mg/kg	1.03	Gamma - detects only	5.82	2.4	mg/kg	95% KM (Chebyshev) UCL	ProUCL output
	Zinc	mg/kg	14.6	Normal	20.6	15.7	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 3.44.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Catfish
Exposure Medium:	Catfish

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reference Reach	Arsenic	mg/kg	0.048	Insufficient Number of Detects	0.001	0.001	mg/kg	Maximum Detect	Insufficient number of detects
	Barium	mg/kg	0.183	Normal - detects only	0.353	0.206	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL output
	Cadmium	mg/kg	0.0196	Insufficient Number of Detects	0.0196	0.0196	mg/kg	Maximum Detect	Insufficient number of detects
	Cobalt	mg/kg	0.0197	Normal - detects only	0.0321	0.0219	mg/kg	Regression on Order Statistics	Statistical software output
	Copper	mg/kg	0.617	Non-Parametric	3.737	1.75	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL output
	Manganese	mg/kg	0.925	Gamma - detects only	2.961	1.17	mg/kg	95% KM (BCA) UCL	ProUCL output
	Mercury	mg/kg	0.0913	Gamma	0.232	0.121	mg/kg	95% Approximate Gamma UCL	ProUCL output
	Nickel	mg/kg	0.248	Normal - detects only	0.405	0.274	mg/kg	Regression on Order Statistics	Statistical software output
	Selenium	mg/kg	0.254	Normal	0.377	0.293	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.868	Non-Parametric	4.536	4.536	mg/kg	Maximum Detect	UCL greater than maximum detect
	Zinc	mg/kg	6.81	Non-Parametric	13.35	8.21	mg/kg	95% Student's-t UCL	ProUCL output
	PCB-1254	mg/kg	0.129	Insufficient Number of Samples	0.189	0.189	mg/kg	Maximum Detect	Insufficient number of samples
	PCB-1260	mg/kg	0.297	Insufficient Number of Samples	0.441	0.441	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDE	mg/kg	0.0154	Insufficient Number of Samples	0.0288	0.0288	mg/kg	Maximum Detect	Insufficient number of samples
	4,4'-DDT	mg/kg	0.00883	Insufficient Number of Samples	0.0128	0.0128	mg/kg	Maximum Detect	Insufficient number of samples
	alpha-Chlordane	mg/kg	0.00913	Insufficient Number of Samples	0.014	0.014	mg/kg	Maximum Detect	Insufficient number of samples
	gamma-Chlordane	mg/kg	0.00635	Insufficient Number of Samples	0.0084	0.0084	mg/kg	Maximum Detect	Insufficient number of samples
	Heptachlor	mg/kg	0.0031	Insufficient Number of Samples	0.0035	0.0035	mg/kg	Maximum Detect	Insufficient number of samples
	Potassium-40	pCi/g	N/A	Insufficient Number of Samples	3.518	3.518	pCi/g	Maximum Detect	Insufficient number of samples
	Radium-226	pCi/g	N/A	Insufficient Number of Samples	0.0589	0.0589	pCi/g	Maximum Detect	Insufficient number of samples

TABLE 3.45.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Crappie
Exposure Medium:	Crappie

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Means	90% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Clinch River Reference Reach	Barium	mg/kg	0.054	Insufficient Number of Detects	0.054	0.054	mg/kg	Maximum Detect	Insufficient number of detects
	Copper	mg/kg	0.193	Normal	0.214	0.205	mg/kg	95% Student's-t UCL	ProUCL output
	Manganese	mg/kg	0.432	Insufficient Number of Detects	0.432	0.432	mg/kg	Maximum Detect	Insufficient number of detects
	Mercury	mg/kg	0.106	Normal	0.177	0.146	mg/kg	95% Student's-t UCL	ProUCL output
	Selenium	mg/kg	0.356	Normal	0.441	0.399	mg/kg	95% Student's-t UCL	ProUCL output
	Strontium	mg/kg	0.249	Non-Parametric	0.907	0.907	mg/kg	Maximum Detect	UCL greater than maximum detect
	Zinc	mg/kg	6.28	Normal	6.825	6.825	mg/kg	95% Student's-t UCL	ProUCL output

TABLE 4.1.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
Ingestion	Resident	Adult	Emory, Clinch or Tennessee River	CW	Chemical Concentration in Water	UCL_{95} or Maximum	mg/L	-	Chronic Daily Intake (CDI) (mg/kg/day) = C_W x IR_W x EF x ED x 1/BW x 1/AT
				IRW	Ingestion Rate of Water	2	L/day	EPA 1995a	
				EF	Exposure Frequency	350	days/yr	Site-specific	
				ED	Exposure Duration	24	yrs	EPA 1989	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Dermal				CW	Chemical Concentration in Water	UCL_{95} or Maximum	µg/L	-	Dermal Absorbed Dose (DAD) (mg/kg/day) = DA_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				DAevent	Dose absorbed per unit area per event	Chem.-specific	mg/cm^2-event	EPA 2004b	Where DA_{event} (mg/cm^2-event) is calculated in accordance
				SA	Skin surface area available for contact	18000	cm^2	EPA 2004b	with EPA Superfund Dermal Risk Guidance (EPA, 2001)
				ET	Exposure Time	0.58	hr/day	EPA 2004b	
				EV	Event	1	event/day	EPA 2004b	
				EF	Exposure Frequency	350	days/yr	Site-specific	
				ED	Exposure Duration	24	yrs	EPA 1989	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Ingestion	Resident	Child	Emory, Clinch or Tennessee River	CW	Chemical Concentration in Water	UCL_{95} or Maximum	µg/L	-	Chronic Daily Intake (CDI) (mg/kg/day) = C_W x IR_W x EF x ED x CF_1 x 1/BW x 1/AT
				IRW	Ingestion Rate of Water	1	L/day	EPA 1995a	
				EF	Exposure Frequency	350	days/yr	Site-specific	
				ED	Exposure Duration	6	yrs	EPA 1989	
				BW	Body Weight	15	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	2190	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Dermal				CW	Chemical Concentration in Water	UCL_{95} or Maximum	µg/L	-	Dermal Absorbed Dose (DAD) (mg/kg/day) = DA_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				DAevent	Dose absorbed per unit area per event	Chem.-specific	mg/cm^2-event	EPA 2004b	Where DA_{event} (mg/cm^2-event) is calculated in accordance
				SA	Skin surface area available for contact	6600	cm^2	EPA 2004b	with EPA Superfund Dermal Risk Guidance (EPA, 2001)
				ET	Exposure Time	1	hr/day	EPA 2004b	
				EV	Event	1	event/day	EPA 2004b	
				EF	Exposure Frequency	350	days/yr	Site-specific	

TABLE 4.1.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
				ED	Exposure Duration	6	yrs	EPA 1989	
				BW	Body Weight	15	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	2190	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365

Notes:
cm^2 = square centimeter
g = grams
hr = hours
kg = kilograms
L = liters
mg = milligrams
m^3 = cubic meter
yrs = years
µg = micrograms

TABLE 4.2.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
Ingestion	Swimmer	Adult	Emory, Clinch or Tennessee River	C_{sw}	Chemical Concentration in Surface Water	UCL_{95} or Maximum	mg/L	Site-specific	Chronic Daily Intake (CDI) (mg/kg/day) = C_{sw} x IR_{sw} x EF x ED x 1/BW x 1/AT
				IR_{sw}	Ingestion Rate of Surface Water	0.05	L/hr	EPA 1998	
				ET	Exposure Time	1.4	hr/day	Site-specific	
				EF	Exposure Frequency	45	days/yr	EPA 2000a	
				ED	Exposure Duration	24	yrs	EPA 1991b	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Dermal				C_{sw}	Chemical Concentration in Surface Water	max or 95% UCL	µg/L	Site-specific	Dermal Absorbed Dose (DAD) (mg/kg/day) = DA_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				DA_{event}	Dose absorbed per unit area per event	Chem.-specific	mg/cm^2-event	EPA 2004b	Where DA_{event} (mg/cm^2-event) is calculated in accordance
				SAw	Skin surface area available for contact	18,000	cm^2	EPA 2004b	with Draft EPA Superfund Dermal Risk Guidance (EPA, 2001a)
				ET	Exposure Time	1.4	hr/day	Site-specific	
				EV	Event	1	event/day	EPA 2001b	
				EF	Exposure Frequency	45	days/yr	EPA 2000a	
				ED	Exposure Duration	24	yrs	EPA 1991b	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Ingestion	Swimmer	Adolescent	Emory, Clinch or Tennessee River	C_{sw}	Chemical Concentration in Surface Water	max or 95% UCL	mg/L	Site-specific	Chronic Daily Intake (CDI) (mg/kg/day) = C_{sw} x IR_{sw} x EF x ED x 1/BW x 1/AT
				IR_{sw}	Ingestion Rate of Surface Water	0.05	L/day	EPA 1998	
				ET	Exposure Time	1.4	hr/day	Site-specific	
				EF	Exposure Frequency	45	days/yr	EPA 1998	
				ED	Exposure Duration	10	yrs	EPA 1989	
				BW	Body Weight	45	kg	EPA 2000a	
				AT-NC	Averaging Time (noncancer)	3,650	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Dermal				C_{sw}	Chemical Concentration in Surface Water	max or 95% UCL	µg/L	Site-specific	Dermal Absorbed Dose (DAD) (mg/kg/day) = DA_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				DA_{event}	Dose absorbed per unit area per event	Chem.-specific	mg/cm^2-event	EPA 2001b	Where DA_{event} (mg/cm^2-event) is calculated in accordance
				SAw	Skin surface area available for contact	14,675	cm^2	EPA 1997	with Draft EPA Superfund Dermal Risk Guidance (EPA 2001b)
				ET	Exposure Time	1.4	hr/day	Site-specific	
				EV	Event	1	event/day	EPA 2001b	

TABLE 4.2.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
				EF	Exposure Frequency	45	days/yr	EPA 2000a	
				ED	Exposure Duration	10	yrs	EPA 1989	
				BW	Body Weight	45	kg	EPA 2000a	
				AT-NC	Averaging Time (noncancer)	3,650	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365

Notes:

cm^2 = square centimeter	L = liters
g = grams	mg = milligrams
hr = hours	yrs = years
kg = kilograms	µg= micrograms

TABLE 4.3.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Seasonally Exposed Sediment
Exposure Medium:	Seasonally Exposed Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
Ingestion	Recreational	Adult	Emory or Clinch River Shoreline	C_{so}	Chemical Concentration in Sediment	UCL_{95} or Maximum	mg/kg or pCi/g	-	Chronic Daily Intake (CDI) (mg/kg/day) =C_{so} x IR_{so} x EF x ED x CF_1 x 1/BW x 1/AT
				IR_{so}	Ingestion Rate of Sediment	100	mg/day or pCi	EPA 1991	Chronic Daily Intake (CDI) (pCi) =Cso x IRso x EF x ED x CF_2
				EF	Exposure Frequency	48	days/yr	EPA 1991	
				ED	Exposure Duration	24	yrs	EPA 1989	
				CF_1	Conversion Factor	1.E-06	kg/mg	-	
				CF_2	Conversion Factor	1.E-03	g/mg	-	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Dermal				C_{so}	Chemical Concentration in Sediment	UCL_{95} or Maximum	mg/kg	-	Dermal Absorbed Dose (DAD) (mg/kg/day) = DA_{event} x SA x EF x ED x 1/BW x 1/AT
				DAevent	Dose absorbed per unit area per event	Chem.-specific	mg/cm^{2}-event	EPA 2004b	Where DA_{event} (mg/cm^2-event) is calculated in accordance
				SA	Skin surface area available for contact	5700	cm^2	EPA 2004b	with EPA Superfund Dermal Risk Guidance (EPA, 2001)
				EF	Exposure Frequency	48	days/yr	Site-specific	
				ED	Exposure Duration	24	yrs	EPA 1989	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
External Exposure				C_{so}	Radionuclide Concentration in Sediment	UCL_{95} or Maximum	pCi/g	EPA 2000	EE_{rad} = C_s X EF X ED x ACF X ET_o
				EF	Exposure Frequency	48	days/yr	EPA 2000	
				ED	Exposure Duration	24	yrs	EPA 2000	
				ACF	Area Correction Factor	0.9	unitless	EPA 2000	
				ET_o	Exposure Time - Outdoor	0.0625	unitless	EPA 2000	1.5/24
Ingestion	Recreational	Adolescent	Emory or Clinch River Shoreline	C_{so}	Chemical Concentration in Sediment	UCL_{95} or Maximum	mg/kg or pCi/g	-	Chronic Daily Intake (CDI) (mg/kg/day) =Cso x IRso x EF x ED x CF_1 x 1/BW x 1/AT
				IR_{so}	Ingestion Rate of Sediment	120	mg/day or pCi	EPA 1991	Chronic Daily Intake (CDI) (pCi) =Cso x IRso x EF x ED x CF_2
				EF	Exposure Frequency	48	days/yr	Site-specific	
				ED	Exposure Duration	10	yrs	EPA 1989	
				CF_1	Conversion Factor	1.E-06	kg/mg	-	
				CF_2	Conversion Factor	1.E-03	g/mg	-	
				BW	Body Weight	45	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	3650	days	EPA 1989	AT-NC = ED*365

TABLE 4.3.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Dermal				C_{so}	Chemical Concentration in Sediment	UCL_{95} or Maximum	mg/kg	-	Dermal Absorbed Dose (DAD) (mg/kg/day) = DA_{event} x SA x EF x ED x 1/BW x 1/AT
				DAevent	Dose absorbed per unit area per event	Chem.-specific	mg/cm^{2}-event	EPA 2001b	Where DA_{event} (mg/cm^2-event) is calculated in accordance
				SA	Skin surface area available for contact	3522	cm^2	EPA 2001b	with EPA Superfund Dermal Risk Guidance (EPA, 2001)
				EF	Exposure Frequency	48	days/yr	Site-specific	
				ED	Exposure Duration	10	yrs	EPA 1989	
				BW	Body Weight	45	kg	EPA 1989	
				AT-NC	Averaging Time (noncancer)	3650	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
External Exposure				C_{so}	Radionuclide Concentration in Sediment	UCL_{95} or Maximum	pCi/g	EPA 2000	$EE_{rad} = C_s$ X EF X ED x ACF X ET_o
				EF	Exposure Frequency	48	days/yr	EPA 2000	
				ED	Exposure Duration	10	yrs	EPA 2000	
				ACF	Area Correction Factor	0.9	unitless	EPA 2000	
				ET_o	Exposure Time - Outdoor	0.0625	unitless	EPA 2000	1.5/24

Notes:

cm^2 = square centimeter	L = liters
g = grams	mg = milligrams
hr = hours	yrs = years
kg = kilograms	pCi = picocurie

TABLE 4.4.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Medium:	Fish
Exposure Medium:	Fish

Exposure Route	Population	Age	Exposure Point	r Code	Parameter Definition	Value	Units	Rationale / Reference	Intake Equation/Model Name
Ingestion	Recreator	Adult	Emory or Clinch River	C_{fish}	Chemical Concentration in Fish	UCL_{95} or Maximum	mg/kg or pCi/g	-	Chronic Daily Intake (CDI) (mg/kg/day) = C_{fish} x IR_{fish} x EF x ED x CF_1 x 1/BW x 1/AT
				IR_{fish}	Ingestion Rate of Fish	54	g/day or pCi	EPA 1991	Chronic Daily Intake (CDI) (pCi) = C_{fish} x IR_{fish} x EF x ED x CF_1
				IR_{fish}	Ingestion Rate of Fish	6.5	g/day or pCi	TDEC 2009	
				EF	Exposure Frequency	350	days/yr	EPA 1991	
				ED	Exposure Duration - Future	24	yrs	EPA 1989	
				CF_1	Conversion Factor	1.E-03	g/mg	-	
				BW	Body Weight	70	kg	EPA 1989	
				AT-NC_F	Averaging Time (noncancer - future)	8760	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365
Ingestion	Resident	Child	Emory or Clinch River	C_{fish}	Chemical Concentration in Fish	UCL_{95} or Maximum	mg/kg or pCi/g	-	Chronic Daily Intake (CDI) (mg/kg/day) = C_{fish} x IR_{fish} x EF x ED x CF_1 x 1/BW x 1/AT
				IR_{fish}	Ingestion Rate of Fish	54	g/day or pCi	EPA 1991	Chronic Daily Intake (CDI) (pCi) = C_{fish} x IR_{fish} x EF x ED x CF_1
				IR_{fish}	Ingestion Rate of Fish	6.5	g/day or pCi	TDEC 2009	
				EF	Exposure Frequency	350	days/yr	EPA 1991	
				ED_F	Exposure Duration - Future	6	yrs	EPA 1989	
				CF_3	Conversion Factor	1.E-03	g/mg	-	
				BW	Body Weight	15	kg	EPA 1989	
				AT-NC_F	Averaging Time (noncancer - future)	2190	days	EPA 1989	AT-NC = ED*365
				AT- C	Averaging Time (cancer)	25,550	days	EPA 1989	AT-C = 70*365

Notes:

g = grams mg = milligrams pCi = picocurie

kg = kilograms yrs = years

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
Kingston Ash Recovery Project

Chemical of Potential Concern	Chronic / Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertanty / Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYY)
Aluminum	Chronic	1.00E+00	mg/kg-day	100%	1.00E+00	mg/kg-day^{-1}	Neurological	NA	PPRTV	11/2011
Antimony	Chronic	4.00E-04	mg/kg-day	15%	6.00E-05	mg/kg-day^{-1}	blood	1000	IRIS	12/21/2011
Arsenic	Chronic	3.00E-04	mg/kg-day	100%	3.00E-04	mg/kg-day^{-1}	skin	3	IRIS	12/21/2011
Barium	Chronic	2.00E-01	mg/kg-day	7%	1.40E-02	mg/kg-day^{-1}	Kidney	300	IRIS	12/21/2011
Beryllium	Chronic	2.00E-03	mg/kg-day	1%	1.40E-05	mg/kg-day^{-1}	intestinal tract	300	IRIS	12/21/2011
Boron	Chronic	2.00E-01	mg/kg-day	100%	2.00E-01	mg/kg-day^{-1}	weight	66	IRIS	12/21/2011
Cadmium (diet)	Chronic	1.00E-03	mg/kg-day	3%	2.50E-05	mg/kg-day^{-1}	Kidney	10	IRIS	12/21/2011
Cadmium (water)	Chronic	5.00E-04	mg/kg-day	3%	5.00E-04	mg/kg-day^{-1}	Kidney	10	IRIS	12/21/2011
Chromium	Chronic	1.50E+00	mg/kg-day	1%	1.95E-02	mg/kg-day^{-1}	None	1000	IRIS	12/21/2011
Cobalt	Chronic	3.00E-04	mg/kg-day	100%	3.00E-04	mg/kg-day^{-1}	Thyroid	NA	PPRTV	11/2011
Copper	Chronic	4.00E-02	mg/kg-day	100%	4.00E-02	mg/kg-day^{-1}	Gastrointestinal tract	NA	HEAST	1997
Iron	Chronic	7.00E-01	mg/kg-day	100%	7.00E-01	mg/kg-day^{-1}	Gastrointestinal tract	NA	PPRTV	11/2011
Lead	Chronic	NA	mg/kg-day	100%	NA	mg/kg-day^{-1}	NA	NA	IRIS	12/21/2011
Manganese (diet)	Chronic	1.40E-01	mg/kg-day	100%	1.40E-01	mg/kg-day^{-1}	CNS	1	IRIS	12/21/2011
Manganese (water)	Chronic	2.40E-02	mg/kg-day	100%	2.40E-02	mg/kg-day^{-1}	CNS	1	IRIS	12/21/2011
Mercury	Chronic	3.00E-04	mg/kg-day	7%	2.10E-05	mg/kg-day^{-1}	autoimmune	1000	IRIS	12/21/2011
Mercury (methyl)	Chronic	1.00E-04	mg/kg-day	NA	NA	mg/kg-day^{-1}	neuropsychological	10	IRIS	12/21/2011
Molybdenum	Chronic	5.00E-03	mg/kg-day	100%	5.00E-03	mg/kg-day^{-1}	blood	30	IRIS	12/21/2011
Nickel	Chronic	2.00E-02	mg/kg-day	4%	8.00E-04	mg/kg-day^{-1}	weight	300	IRIS	12/21/2011
Selenium	Chronic	5.00E-03	mg/kg-day	100%	5.00E-03	mg/kg-day^{-1}	selenosis	3	IRIS	12/21/2011
Silver	Chronic	5.00E-03	mg/kg-day	4%	2.00E-04	mg/kg-day^{-1}	skin	3	IRIS	12/21/2011
Strontium	Chronic	6.00E-01	mg/kg-day	100%	6.00E-01	mg/kg-day^{-1}	bone	300	IRIS	12/21/2011
Thallium	Chronic	1.00E-05	mg/kg-day	100%	1.00E-05	mg/kg-day^{-1}	Hair follicle	NA	PPRTV	11/2011
Vanadium	Chronic	5.04E-03	mg/kg-day	100%	5.04E-03	mg/kg-day^{-1}	Gastrointestinal tract	NA	IRIS	12/21/2011
Zinc	Chronic	3.00E-01	mg/kg-day	100%	3.00E-01	mg/kg-day^{-1}	blood	3	IRIS	12/21/2011
Acenaphthene	Chronic	6.00E-02	mg/kg-day	100%	6.00E-02	mg/kg-day^{-1}	liver	3000	IRIS	12/21/2011
Acenaphthylene	Chronic	6.00E-02	mg/kg-day	100%	6.00E-02	mg/kg-day^{-1}	NA	NA	Acenaphthene used as surrogate	12/21/2011
Anthracene	Chronic	3.00E-01	mg/kg-day	100%	3.00E-01	mg/kg-day^{-1}	None	3000	IRIS	12/21/2011
Benzo(a)anthracene	Chronic	NA	mg/kg-day	100%	NA	mg/kg-day^{-1}	NA	NA	IRIS	12/21/2011
Benzo(a)pyrene	Chronic	NA	mg/kg-day	100%	NA	mg/kg-day^{-1}	NA	NA	IRIS	12/21/2011

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
Kingston Ash Recovery Project

Chemical of Potential Concern	Chronic / Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertanty / Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYY)
Benzo(b)fluoranthene	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
Benzo(g,h,i)perylene	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
Benzo(k)fluoranthene	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
Chrysene	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
Dibenz(a,h)anthracene	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
Fluoranthene	Chronic	4.00E-02	mg/kg-day	100%	4.00E-02	$mg/kg\text{-}day^{-1}$	Kidney	3000	IRIS	12/21/2011
Fluorene	Chronic	4.00E-02	mg/kg-day	100%	4.00E-02	$mg/kg\text{-}day^{-1}$	blood	3000	IRIS	12/21/2011
Indeno(1,2,3-cd)pyrene	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
Naphthalene	Chronic	2.00E-02	mg/kg-day	100%	2.00E-02	$mg/kg\text{-}day^{-1}$	weight	3000	IRIS	12/21/2011
Phenanthrene	Chronic	3.00E-02	mg/kg-day	100%	3.00E-02	$mg/kg\text{-}day^{-1}$	NA	NA	Pyrene used as surrogate	12/21/2011
Pyrene	Chronic	3.00E-02	mg/kg-day	100%	3.00E-02	$mg/kg\text{-}day^{-1}$	kidney	3000	IRIS	12/21/2011
PCB-1254	Chronic	2.00E-05	mg/kg-day	100%	2.00E-05	$mg/kg\text{-}day^{-1}$	eye	300	IRIS	12/21/2011
PCB-1260	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
4,4'-DDD	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
4,4'-DDE	Chronic	NA	mg/kg-day	100%	NA	$mg/kg\text{-}day^{-1}$	NA	NA	IRIS	12/21/2011
4,4'-DDT	Chronic	5.00E-04	mg/kg-day	100%	5.00E-04	$mg/kg\text{-}day^{-1}$	liver	100	IRIS	12/21/2011
alpha-BHC	Chronic	5.00E-04	mg/kg-day	100%	5.00E-04	$mg/kg\text{-}day^{-1}$	NA	NA	ATSDR	08/01/2005
alpha-Chlordane	Chronic	8.00E-03	mg/kg-day	100%	8.00E-03	$mg/kg\text{-}day^{-1}$	Liver	NA	Chlordane used as surrogate	12/21/2011
beta-BHC	Chronic	8.00E-03	mg/kg-day	100%	8.00E-03	$mg/kg\text{-}day^{-1}$	NA	NA	ATSDR	08/01/2005
gamma-Chlordane	Chronic	5.00E-04	mg/kg-day	100%	5.00E-04	$mg/kg\text{-}day^{-1}$	Liver	NA	IRIS	12/21/2011
Heptachlor	Chronic	5.00E-04	mg/kg-day	100%	5.00E-04	$mg/kg\text{-}day^{-1}$	liver	300	IRIS	12/21/2011

1 Oral Absorption Efficiencies were obtained from EPA 2004a, Table 4-1

2 Absorbed Reference Dose for Dermal were derived from Oral Reference Dose by the following conversion [Reference Dose * Absorption Efficiency]

NA = Not available

Provisional Peer Reviewed Toxicity Values were obtained from the November 2011 Regional Risk-Based Screening Tables

Toxicity values for Chlordane were used as surrogates for alpha- and gamma-chlordane

ATSDR - Toxicity Profile for TOXICOLOGICAL PROFILE FOR ALPHA-, BETA-, GAMMA-, AND DELTA-HEXACHLOROCYCLOHEXANE August 2005

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
Kingston Ash Recovery Project

Chemial of Potential Concern	Oral Cancer Slope Factor		Oral Abssorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence / Cancer Guidance Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date (MM/DD/YYYY)
Aluminum	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Antimony	NA	$(mg/kg\text{-}day)^{-1}$	15%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Arsenic	1.50E+00	$(mg/kg\text{-}day)^{-1}$	100%	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A, Human Carcinogen	IRIS	12/21/11
Barium	NA	$(mg/kg\text{-}day)^{-1}$	7%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Beryllium	NA	$(mg/kg\text{-}day)^{-1}$	1%	NA	$(mg/kg\text{-}day)^{-1}$	B1, Probable human carcinogen - based on limited evidence of carcinogenicity in humans	IRIS	12/21/11
Boron	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Cadmium	NA	$(mg/kg\text{-}day)^{-1}$	3%	NA	$(mg/kg\text{-}day)^{-1}$	B1, Probable human carcinogen - based on limited evidence of carcinogenicity in humans	IRIS	12/21/11
Chromium	NA	$(mg/kg\text{-}day)^{-1}$	1%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Cobalt	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Copper	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Hex. Chromium	NA	$(mg/kg\text{-}day)^{-1}$	3%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity (Oral route)	IRIS	12/21/11
Iron	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Lead	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Manganese	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Mercury	NA	$(mg/kg\text{-}day)^{-1}$	7%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Molybdenum	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Nickel	NA	$(mg/kg\text{-}day)^{-1}$	4%	NA	$(mg/kg\text{-}day)^{-1}$	Information reviewed but value not estimated. Refer to IRIS Summary.	IRIS	12/21/11
Selenium	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Silver	NA	$(mg/kg\text{-}day)^{-1}$	4%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Strontium	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Thallium	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Vanadium	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Zinc	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Acenaphthene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	Not Assessed under the IRIS program.	IRIS	12/21/11
Acenaphthylene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Anthracene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Benzo(a)anthracene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	100%	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Benzo(a)pyrene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	100%	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Benzo(b)fluoranthene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	100%	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Benzo(g,h,i)perylene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Benzo(k)fluoranthene	7.30E-02	$(mg/kg\text{-}day)^{-1}$	100%	7.30E-02	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Chrysene	7.30E-03	$(mg/kg\text{-}day)^{-1}$	100%	7.30E-03	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Dibenz(a,h)anthracene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	100%	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Fluoranthene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
Kingston Ash Recovery Project

Chemial of Potential Concern	Oral Cancer Slope Factor		Oral Abssorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence / Cancer Guidance Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date (MM/DD/YYYY)
Fluorene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Indeno(1,2,3-cd)pyrene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	100%	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Naphthalene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	C, Possible human carcinogen	IRIS	12/21/11
Phenanthrene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
Pyrene	NA	$(mg/kg\text{-}day)^{-1}$	100%	NA	$(mg/kg\text{-}day)^{-1}$	D, Not classifiable as to human carcinogenicity	IRIS	12/21/11
PCB-1254	2.00E+00	$(mg/kg\text{-}day)^{-1}$	100%	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
PCB-1260	2.00E+00	$(mg/kg\text{-}day)^{-1}$	100%	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
4,4'-DDD	2.40E-01	$(mg/kg\text{-}day)^{-1}$	100%	2.40E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
4,4'-DDE	3.40E-01	$(mg/kg\text{-}day)^{-1}$	100%	3.40E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
4,4'-DDT	3.40E-01	$(mg/kg\text{-}day)^{-1}$	100%	3.40E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
alpha-BHC	6.30E+00	$(mg/kg\text{-}day)^{-1}$	100%	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
alpha-Chlordane	3.50E-01	$(mg/kg\text{-}day)^{-1}$	100%	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
beta-BHC	1.80E+00	$(mg/kg\text{-}day)^{-1}$	100%	1.80E+00	$(mg/kg\text{-}day)^{-1}$	C, Possible human carcinogen	IRIS	12/21/11
gamma-Chlordane	3.50E-01	$(mg/kg\text{-}day)^{-1}$	100%	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Heptachlor	4.50E+00	$(mg/kg\text{-}day)^{-1}$	100%	4.50E+00	$(mg/kg\text{-}day)^{-1}$	B2, Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	12/21/11
Cesium-137	4.33E-11	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Potassium-40	6.18E-11	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Radium-226+D	7.30E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Radium-228+D	2.29E-09	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Thorium-228	2.89E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Thorium-230	2.02E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Thorium-232	2.31E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Thorium-234	6.70E-11	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Uranium-234	1.58E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Uranium-235+D	1.63E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10
Uranium-238+D	2.10E-10	risk/pCi	NA	NA	NA	A, Human Carcinogen	EPA2010	08/01/10

1 Oral Absorption Efficiencies were obtained from EPA 2004a, Table 4-1

2 Absorbed Cancer Slope Factors for Dermal were derived from Oral Cancer Slope Factors by the following conversion [Cancer Slope Factor/Absorption Efficiency]

NA = Not Available

TABLE 6.4
CANCER TOXICITY DATA -- EXTERNAL (RADIATION)
Kingston Ash Recovery Project

Chemical of Potential Concern	Cancer Slope Factor		Source(s)	Date(s) (MM/DD/YYYY)
	Value	Units		
Cesium-137+D	2.5E-06	risk/yr per pCi/g	EPA 2010	08/01/2010
Potassium-40	8.0E-07	risk/yr per pCi/g	EPA 2010	08/01/2010
Radium-226+D	8.5E-06	risk/yr per pCi/g	EPA 2010	08/01/2010
Radium-228+D	1.2E-05	risk/yr per pCi/g	EPA 2010	08/01/2010
Thorium-228	5.6E-09	risk/yr per pCi/g	EPA 2010	08/01/2010
Thorium-230	8.2E-10	risk/yr per pCi/g	EPA 2010	08/01/2010
Thorium-232	3.4E-10	risk/yr per pCi/g	EPA 2010	08/01/2010
Thorium-234	1.1E-07	risk/yr per pCi/g	EPA 2010	08/01/2010
Uranium-234	2.5E-10	risk/yr per pCi/g	EPA 2010	08/01/2010
Uranium-235+D	5.2E-07	risk/yr per pCi/g	EPA 2010	08/01/2010
Uranium-238+D	1.1E-07	risk/yr per pCi/g	EPA 2010	08/01/2010

EPA 2010 Residential Soil Preliminary Remediation Goals for Radionuclides http://epa-prgs.ornl.gov/radionuclides/download.l

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach A	Ingestion	Aluminum	0.149	mg/L	1.40E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0041
				Antimony	0.00042	mg/L	3.95E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.15E-05	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.029
				Arsenic	0.00171	mg/L	1.61E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-05	4.68E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.16
				Barium	0.0428	mg/L	4.02E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.17E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0059
				Boron	0.0224	mg/L	2.10E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.14E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0031
				Chromium	0.00083938	mg/L	7.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.30E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0077
				Copper	0.00168	mg/L	1.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.60E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0012
				Iron	0.121	mg/L	1.14E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.32E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0047
				Manganese	0.0316	mg/L	2.97E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.66E-04	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.036
				Mercury	0.00019	mg/L	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.21E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.017
				Molybdenum	0.00111	mg/L	1.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.04E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0061
				Nickel	0.00055247	mg/L	5.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.51E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00076
				Selenium	0.00048313	mg/L	4.54E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.32E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0026
				Strontium	0.119	mg/L	1.12E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0054
				Vanadium	0.00208	mg/L	1.95E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.70E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Zinc	0.0137	mg/L	1.29E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.75E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0013
			Exp. Route Total								2.E-05					0.3
		Exposure Point Total									2.E-05					0.3
		Emory River Reach A	Dermal	Aluminum	0.149	mg/L	7.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.13E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000021
				Antimony	0.00042	mg/L	2.06E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.01E-08	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.00015
				Arsenic	0.00171	mg/L	8.38E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-07	2.45E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00082
				Barium	0.0428	mg/L	2.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.12E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000031
				Boron	0.0224	mg/L	1.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.20E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000016
				Chromium	0.00083938	mg/L	4.12E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000040
				Copper	0.00168	mg/L	8.24E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.40E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000060
				Iron	0.121	mg/L	5.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.73E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000025
				Manganese	0.0316	mg/L	1.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.52E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00019
				Mercury	0.00019	mg/L	9.32E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.72E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000091
				Molybdenum	0.00111	mg/L	5.44E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.59E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000032
				Nickel	0.00055247	mg/L	5.42E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.58E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000079
				Selenium	0.00048313	mg/L	2.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.91E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000014
				Strontium	0.119	mg/L	5.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.70E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000028
				Vanadium	0.00208	mg/L	1.02E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.97E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000059
				Zinc	0.0137	mg/L	4.03E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-06	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000039
			Exp. Route Total								1.E-07					0.002
		Exposure Point Total									1.E-07					0.002
	Exposure Medium Total										2.E-05					0.3
Medium Total											2.E-05					0.3
									Total of Receptor Risks Across All Media		2.E-05		Total of Receptor Hazards Across All Media			0.3

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach A	Ingestion	Aluminum	0.149	mg/L	8.16E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.53E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0095
				Antimony	0.00042	mg/L	2.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.68E-05	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.067
				Arsenic	0.00171	mg/L	9.37E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-05	1.09E-04	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.36
				Barium	0.0428	mg/L	2.35E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.74E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.014
				Boron	0.0224	mg/L	1.23E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0072
				Chromium	0.00083938	mg/L	4.60E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.37E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.018
				Copper	0.00168	mg/L	9.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0027
				Iron	0.121	mg/L	6.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.74E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.011
				Manganese	0.0316	mg/L	1.73E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.02E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.084
				Mercury	0.00019	mg/L	1.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.040
				Molybdenum	0.00111	mg/L	6.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.10E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.014
				Nickel	0.00055247	mg/L	3.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.53E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0018
				Selenium	0.00048313	mg/L	2.65E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0062
				Strontium	0.119	mg/L	6.52E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.61E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.013
				Vanadium	0.00208	mg/L	1.14E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.027
				Zinc	0.0137	mg/L	7.51E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.76E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0029
			Exp. Route Total								1.E-05					0.7
		Exposure Point Total									1.E-05					0.7
		Emory River Reach A	Dermal	Aluminum	0.149	mg/L	3.77E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.77E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000038
				Antimony	0.00042	mg/L	1.06E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.00027
				Arsenic	0.00171	mg/L	4.33E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	6.E-07	4.33E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0014
				Barium	0.0428	mg/L	1.08E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000054
				Boron	0.0224	mg/L	5.67E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.67E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000028
				Chromium	0.00083938	mg/L	2.12E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000071
				Copper	0.00168	mg/L	4.25E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.25E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000011
				Iron	0.121	mg/L	3.06E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.06E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000044
				Manganese	0.0316	mg/L	8.00E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.00E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00033
				Mercury	0.00019	mg/L	4.81E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.81E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00016
				Molybdenum	0.00111	mg/L	2.81E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.81E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000056
				Nickel	0.00055247	mg/L	2.80E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.80E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000014
				Selenium	0.00048313	mg/L	1.22E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.22E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000024
				Strontium	0.119	mg/L	3.01E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.01E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000050
				Vanadium	0.00208	mg/L	5.27E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.27E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00011
				Zinc	0.0137	mg/L	2.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-06	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000069
			Exp. Route Total								6.E-07					0.003
		Exposure Point Total									6.E-07					0.000
	Exposure Medium Total										6.E-07					0.7
Medium Total											1.E-05					0.7
									Total of Receptor Risks Across All Media		1.E-05	Total of Receptor Hazards Across All Media				0.7

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach A	Ingestion	Aluminum	40823	mg/kg	2.63E-03	mg/kg-day	No toxicity value	$(mg/kg-day)^{-1}$	NA	7.67E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0077
				Antimony	1.8	mg/kg	1.16E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.38E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.00085
				Arsenic	18.72	mg/kg	1.21E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-06	3.52E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.012
				Barium	169.8	mg/kg	1.09E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.19E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00016
				Beryllium	1.52	mg/kg	9.79E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.86E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00014
				Boron	35.39	mg/kg	2.28E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.65E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000033
				Chromium	49.16	mg/kg	3.17E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.24E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0031
				Cobalt	24.88	mg/kg	1.60E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.67E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.016
				Copper	22.06	mg/kg	1.42E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.14E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00010
				Chromium VI	1.2	mg/kg	7.73E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.25E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000075
				Lead	67.89	mg/kg	4.37E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1511	mg/kg	9.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0020
				Mercury	0.0865	mg/kg	5.57E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000054
				Nickel	25.41	mg/kg	1.64E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.77E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00024
				Selenium	3.05	mg/kg	1.96E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.73E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00011
				Strontium	102.2	mg/kg	6.58E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.92E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000032
				Vanadium	55.44	mg/kg	3.57E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0021
				Zinc	74.73	mg/kg	4.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000047
				Iron	39267	mg/kg	2.53E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.38E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.011
				Anthracene	0.001	mg/kg	6.44E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.88E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00000000063
				Benzo(a)anthracene	0.0077	mg/kg	4.96E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-10	1.45E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0079	mg/kg	5.09E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	4.E-09	1.48E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.027	mg/kg	1.74E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	5.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.018	mg/kg	1.16E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	8.E-11	3.38E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.013	mg/kg	8.37E-10	mg/kg-day	7.3E-03	(mg/kg-day)-1	6.E-12	2.44E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0012	mg/kg	7.73E-11	mg/kg-day	7.3E+00	(mg/kg-day)-1	6.E-10	2.25E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.012	mg/kg	7.73E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.25E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000056
				Indeno(1,2,3-cd)pyrene	0.0029	mg/kg	1.87E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-10	5.45E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.00077	mg/kg	4.96E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000000072
				Phenanthrene	0.0021	mg/kg	1.35E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.95E-10	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000013
				Pyrene	0.017	mg/kg	1.09E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.19E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000011
				alpha-Chlordane	0.023	mg/kg	1.48E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	5.E-10	4.32E-09	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0000086
				beta-BHC	0.00062	mg/kg	3.99E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	7.E-11	1.16E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000015
				gamma-Chlordane	0.036	mg/kg	2.32E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	8.E-10	6.76E-09	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000014
			Exp. Route Total								2.E-06					0.05
			Dermal	Aluminum	40823	mg/kg	ND	mg/kg-day	No toxicity value	$(mg/kg-day)^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	1.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	18.72	mg/kg	1.65E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	3.E-06	4.81E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.017
				Barium	169.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.52	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	35.39	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	49.16	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	24.88	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	22.06	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	1.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Lead	67.89	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1511	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.0865	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	25.41	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Selenium	3.05	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-03	1/(mg/kg-day)	NA
				Strontium	102.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	55.44	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	74.73	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	39267	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Anthracene	0.001	mg/kg	3.82E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000037
				Benzo(a)anthracene	0.0077	mg/kg	2.94E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	8.58E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0079	mg/kg	3.02E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-08	8.80E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.027	mg/kg	1.03E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-09	3.01E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.018	mg/kg	6.87E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	5.E-10	2.00E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.013	mg/kg	4.96E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	4.E-11	1.45E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0012	mg/kg	4.58E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-09	1.34E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.012	mg/kg	4.58E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.34E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000033
				Indeno(1,2,3-cd)pyrene	0.0029	mg/kg	1.11E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-10	3.23E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.00077	mg/kg	2.26E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.60E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000033
				Phenanthrene	0.0021	mg/kg	6.17E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.80E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000060
				Pyrene	0.017	mg/kg	4.99E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000049
				alpha-Chlordane	0.023	mg/kg	2.70E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	9.E-10	7.88E-09	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000016
				beta-BHC	0.00062	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				gamma-Chlordane	0.036	mg/kg	4.23E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-09	1.23E-08	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000025
			Exp. Route Total								3.E-06					0.02
		Exposure Point Total									4.E-06					0.07
	Exposure Medium Total										4.E-06					0.07
Medium Total											4.E-06					0.07
Surface Water	Surface Water	Emory River Reach A	Ingestion	Aluminum	0.149	mg/L	6.30E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	1.84E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000018
				Antimony	0.00042	mg/L	1.78E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-08	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.00013
				Arsenic	0.00171	mg/L	7.23E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-07	2.11E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00070
				Barium	0.0428	mg/L	1.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000026
				Boron	0.0224	mg/L	9.47E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.76E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000014
				Chromium	0.00083938	mg/L	3.55E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000034
				Copper	0.00168	mg/L	7.10E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.07E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000052
				Iron	0.121	mg/L	5.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.49E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000021
				Manganese	0.0316	mg/L	1.34E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.90E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00016
				Mercury	0.00019	mg/L	8.03E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000078
				Molybdenum	0.00111	mg/L	4.69E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000027
				Nickel	0.00055247	mg/L	2.34E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.81E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000034
				Selenium	0.00048313	mg/L	2.04E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.96E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000012
				Strontium	0.119	mg/L	5.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000024
				Vanadium	0.00208	mg/L	8.79E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.56E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000051
				Zinc	0.0137	mg/L	5.79E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.69E-06	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000056
			Exp. Route Total								1.E-07					0.001
		Exposure Point Total									1.E-07					0.001
		Emory River Reach A	Dermal	Aluminum	0.149	mg/L	2.27E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	6.61E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000066
				Antimony	0.00042	mg/L	6.39E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-08	mg/kg-day	6.0E-05	1/(mg/kg-day)	0.00031
				Arsenic	0.00171	mg/L	2.60E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	4.E-08	7.59E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00027
				Barium	0.0428	mg/L	6.51E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00014
				Boron	0.0224	mg/L	3.41E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.94E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000050
				Chromium	0.00083938	mg/L	1.28E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.73E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00096
				Copper	0.00168	mg/L	2.56E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.46E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000019
				Iron	0.121	mg/L	1.84E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.37E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000077
				Manganese	0.0316	mg/L	4.81E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0015
				Mercury	0.00019	mg/L	2.89E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.43E-09	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000035
				Molybdenum	0.00111	mg/L	1.69E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.93E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000099
				Nickel	0.00055247	mg/L	1.68E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.90E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000061
				Selenium	0.00048313	mg/L	7.35E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000054
				Strontium	0.119	mg/L	1.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000088
				Vanadium	0.00208	mg/L	3.17E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.23E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00071
				Zinc	0.0137	mg/L	1.25E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.65E-07	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000012
			Exp. Route Total								4.E-08					0.004
	Exposure Medium Total										1.E-07					0.005
Medium Total											1.E-07					0.005
							Total of Receptor Risks Across All Media				5.E-06	Total of Receptor Hazards Across All Media				0.08

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach A	Ingestion	Aluminum	40823	mg/kg	1.70E-03	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.43E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.014
				Antimony	1.8	mg/kg	7.51E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.31E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.0016
				Arsenic	18.72	mg/kg	7.82E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-06	6.56E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.022
				Barium	169.8	mg/kg	7.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.95E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00030
				Beryllium	1.52	mg/kg	6.35E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.33E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00027
				Boron	35.39	mg/kg	1.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.24E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000062
				Chromium	49.16	mg/kg	2.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0057
				Cobalt	24.88	mg/kg	1.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.73E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.029
				Copper	22.06	mg/kg	9.21E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.74E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00019
				Chromium VI	1.2	mg/kg	5.01E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.21E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.00014
				Lead	67.89	mg/kg	2.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1511	mg/kg	6.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.30E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0038
				Mercury	0.0865	mg/kg	3.61E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.03E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00010
				Nickel	25.41	mg/kg	1.06E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.91E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00045
				Selenium	3.05	mg/kg	1.27E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00021
				Strontium	102.2	mg/kg	4.27E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.58E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000060
				Vanadium	55.44	mg/kg	2.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0039
				Zinc	74.73	mg/kg	3.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.62E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000087
				Iron	39267	mg/kg	1.64E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.020
				Anthracene	0.001	mg/kg	4.17E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.51E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000012
				Benzo(a)anthracene	0.0077	mg/kg	3.21E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-10	2.70E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0079	mg/kg	3.30E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-09	2.77E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.027	mg/kg	1.13E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-10	9.47E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.018	mg/kg	7.51E-10	mg/kg-day	7.3E-02	(mg/kg-day)-1	5.E-11	6.31E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.013	mg/kg	5.43E-10	mg/kg-day	7.3E-03	(mg/kg-day)-1	4.E-12	4.56E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0012	mg/kg	5.01E-11	mg/kg-day	7.3E+00	(mg/kg-day)-1	4.E-10	4.21E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.012	mg/kg	5.01E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.21E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000011
				Indeno(1,2,3-cd)pyrene	0.0029	mg/kg	1.21E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	9.E-11	1.02E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.00077	mg/kg	3.21E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.70E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000014
				Phenanthrene	0.0021	mg/kg	8.77E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.36E-10	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000025
				Pyrene	0.017	mg/kg	7.10E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.96E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000020
				alpha-Chlordane	0.023	mg/kg	9.60E-10	mg/kg-day	3.5E-01	(mg/kg-day)-1	3.E-10	8.07E-09	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000016
				beta-BHC	0.00062	mg/kg	2.59E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	5.E-11	2.17E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000027
				gamma-Chlordane	0.036	mg/kg	1.50E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	5.E-10	1.26E-08	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000025
			Exp. Route Total								1.E-06					0.1
			Dermal	Aluminum	40823	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	1.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	18.72	mg/kg	6.61E-07	mg/kg-day	1.6E+00	(mg/kg-day)-1	1.E-06	4.62E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.016
				Barium	169.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.52	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	35.39	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	49.16	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	24.88	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	22.06	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	1.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Lead	67.89	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1511	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.0865	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	25.41	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Selenium	3.05	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-03	1/(mg/kg-day)	NA
				Strontium	102.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	55.44	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	74.73	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	39267	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk	Non-Cancer Hazard Calculations				Hazard Quotient
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
							Value	Units	Value	Units		Value	Units	Value	Units	
				Anthracene	0.001	mg/kg	1.53E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000036
				Benzo(a)anthracene	0.0077	mg/kg	1.18E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	9.E-10	8.24E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0079	mg/kg	1.21E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	9.E-09	8.46E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.027	mg/kg	4.13E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	2.89E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.018	mg/kg	2.75E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	2.E-10	1.93E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.013	mg/kg	1.99E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	1.E-11	1.39E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0012	mg/kg	1.84E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-09	1.28E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.012	mg/kg	1.84E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000032
				Indeno(1,2,3-cd)pyrene	0.0029	mg/kg	4.43E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	3.10E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.00077	mg/kg	9.06E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.34E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000032
				Phenanthrene	0.0021	mg/kg	2.47E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.73E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000058
				Pyrene	0.017	mg/kg	2.00E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000047
				alpha-Chlordane	0.023	mg/kg	1.08E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	4.E-10	7.58E-09	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000015
				beta-BHC	0.00062	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				gamma-Chlordane	0.036	mg/kg	1.69E-09	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-10	1.19E-08	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.000024
			Exp. Route Total								1.E-06					0.02
		Exposure Point Total									2.E-06					0.1
	Exposure Medium Total										2.E-06					0.1
Medium Total											2.E-06					0.1
Surface Water	Surface Water	Emory River Reach A	Ingestion	Aluminum	0.149	mg/L	4.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.86E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000029
				Antimony	0.00042	mg/L	1.15E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.05E-08	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.00020
				Arsenic	0.00171	mg/L	4.68E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-08	3.28E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0011
				Barium	0.0428	mg/L	1.17E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.21E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000041
				Boron	0.0224	mg/L	6.14E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.30E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000021
				Chromium	0.00083938	mg/L	2.30E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000054
				Copper	0.00168	mg/L	4.60E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.22E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000081
				Iron	0.121	mg/L	3.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.32E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000033
				Manganese	0.0316	mg/L	8.66E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.06E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00025
				Mercury	0.00019	mg/L	5.21E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.64E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00012
				Molybdenum	0.00111	mg/L	3.04E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.13E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000043
				Nickel	0.00055247	mg/L	1.51E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000053
				Selenium	0.00048313	mg/L	1.32E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.27E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000019
				Strontium	0.119	mg/L	3.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.28E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000038
				Vanadium	0.00208	mg/L	5.70E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.99E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000080
				Zinc	0.0137	mg/L	3.75E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.63E-06	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000088
			Exp. Route Total								7.E-08					0.002
		Exposure Point Total									7.E-08					0.002
		Emory River Reach A	Dermal	Aluminum	0.149	mg/L	1.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	8.39E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000084
				Antimony	0.00042	mg/L	3.38E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.36E-08	mg/kg-day	6.0E-05	1/(mg/kg-day)	0.00039
				Arsenic	0.00171	mg/L	1.38E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-08	9.63E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00034
				Barium	0.0428	mg/L	3.44E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.41E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00017
				Boron	0.0224	mg/L	1.80E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000063
				Chromium	0.00083938	mg/L	6.75E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.72E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.0012
				Copper	0.00168	mg/L	1.35E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.46E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000024
				Iron	0.121	mg/L	9.73E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.81E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000097
				Manganese	0.0316	mg/L	2.54E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.78E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0019
				Mercury	0.00019	mg/L	1.53E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-08	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000045
				Molybdenum	0.00111	mg/L	8.93E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.25E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000012
				Nickel	0.00055247	mg/L	8.88E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.22E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000078
				Selenium	0.00048313	mg/L	3.88E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.72E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000068
				Strontium	0.119	mg/L	9.57E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.70E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000011
				Vanadium	0.00208	mg/L	1.67E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.17E-07	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00090
				Zinc	0.0137	mg/L	6.61E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.63E-07	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000015
			Exp. Route Total								2.E-08					0.005
	Exposure Medium Total										9.E-08					0.007
Medium Total											9.E-08					0.007
							Total of Receptor Risks Across All Media				2.E-06	Total of Receptor Hazards Across All Media				0.1

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Arsenic	0.005	mg/kg	1.59E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06	3.70E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.012
				Barium	0.056	mg/kg	1.78E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.14E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00021
				Copper	0.342	mg/kg	1.08E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0063
				Manganese	0.216	mg/kg	6.85E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0011
				Mercury (methyl)	0.3472	mg/kg	1.10E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	2.6
				Selenium	0.73	mg/kg	2.31E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.40E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.11
				Strontium	0.353	mg/kg	1.12E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.61E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00044
				Zinc	12.7	mg/kg	4.03E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.39E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.031
				PCB-1260	0.152	mg/kg	4.82E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.12E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0065	mg/kg	2.06E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	7.E-07	4.81E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0052	mg/kg	1.65E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	6.E-07	3.85E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0077
			Exp. Route Total								1.E-04					3
	Exposure Medium Total										1.E-04					3
Medium Total											1.E-04					3
							Total of Receptor Risks Across All Media				1.E-04	Total of Receptor Hazards Across All Media				3

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach A	Ingestion													
				Barium	0.121	mg/kg	3.84E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.95E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00045
				Chromium	0.27	mg/kg	8.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.067
				Copper	0.456	mg/kg	1.45E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.37E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0084
				Iron	13.9	mg/kg	4.41E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.015
				Manganese	0.568	mg/kg	1.80E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.20E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0030
				Mercury (methyl)	0.11632	mg/kg	3.69E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.60E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.86
				Nickel	0.16	mg/kg	5.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0059
				Selenium	0.967	mg/kg	3.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.14
				Silver	0.0183	mg/kg	5.80E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.35E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0027
				Strontium	0.879	mg/kg	2.79E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.50E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0011
				Vanadium	0.059	mg/kg	1.87E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.36E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0087
				Zinc	16.2	mg/kg	5.14E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.040
			Exp. Route Total								0.E+00					1.2
	Exposure Medium Total										0.E+00					1.2
Medium Total											0.E+00					1.2
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				1.2

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Arsenic	0.009	mg/kg	2.85E-06	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.E-06	6.66E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.022
				Barium	0.172	mg/kg	5.45E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.27E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00064
				Cadmium	0.018	mg/kg	5.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.027
				Cobalt	0.0162	mg/kg	5.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.040
				Copper	5.64	mg/kg	1.79E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.17E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.10
				Manganese	0.508	mg/kg	1.61E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.76E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0027
				Mercury (methyl)	0.136	mg/kg	4.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.01E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.0
				Nickel	0.254	mg/kg	8.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.88E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0094
				Selenium	0.411	mg/kg	1.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.04E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.061
				Strontium	0.533	mg/kg	1.69E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.94E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00066
				Zinc	8.74	mg/kg	2.77E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.47E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
				PCB-1254	0.121	mg/kg	3.84E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-05	8.95E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	4.5
				PCB-1260	0.309	mg/kg	9.80E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-04	2.29E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0154	mg/kg	4.88E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.14E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0093	mg/kg	2.95E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	6.88E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.014
				alpha-Chlordane	0.009	mg/kg	2.85E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	6.66E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.013
				gamma-Chlordane	0.0057	mg/kg	1.81E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-07	4.22E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0084
			Exp. Route Total								3.E-04					6
	Exposure Medium Total										3.E-04					6
Medium Total											3.E-04					6
							Total of Receptor Risks Across All Media				3.E-04	Total of Receptor Hazards Across All Media				6

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach A	Ingestion													
				Copper	0.21	mg/kg	6.66E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.55E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0039
				Iron	17.47	mg/kg	5.54E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.018
				Manganese	0.218	mg/kg	6.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0012
				Mercury (methyl)	0.15152	mg/kg	4.80E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.1
				Selenium	0.536	mg/kg	1.70E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.96E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.079
				Strontium	0.327	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00040
				Zinc	9.51	mg/kg	3.01E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.03E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.023
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				1

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Arsenic	0.005	mg/kg	1.48E-06	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	2.E-06	1.73E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.058
				Barium	0.056	mg/kg	1.66E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.93E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00097
				Copper	0.342	mg/kg	1.01E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.030
				Manganese	0.216	mg/kg	6.39E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.46E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0053
				Mercury (methyl)	0.3472	mg/kg	1.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-03	mg/kg-day	1.0E-04	1/(mg/kg-day)	12.
				Selenium	0.73	mg/kg	2.16E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.52E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.50
				Strontium	0.353	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.22E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0020
				Zinc	12.7	mg/kg	3.76E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.38E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.15
				PCB-1260	0.152	mg/kg	4.50E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-05	5.25E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0065	mg/kg	1.92E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	7.E-07	2.24E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0052	mg/kg	1.54E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	5.E-07	1.80E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.036
			Exp. Route Total								9.E-05					13
	Exposure Medium Total										9.E-05					13
Medium Total											9.E-05					13
							Total of Receptor Risks Across All Media				9.E-05	Total of Receptor Hazards Across All Media				13

TABLE 7.10.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach A	Ingestion													
				Barium	0.121	mg/kg	3.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.18E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0021
				Chromium	0.27	mg/kg	7.99E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.32E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.31
				Copper	0.456	mg/kg	1.35E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.57E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.039
				Iron	13.9	mg/kg	4.11E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.80E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.069
				Manganese	0.568	mg/kg	1.68E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.96E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.014
				Mercury (methyl)	0.11632	mg/kg	3.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.02E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.0
				Nickel	0.16	mg/kg	4.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.52E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.028
				Selenium	0.967	mg/kg	2.86E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.34E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.67
				Silver	0.0183	mg/kg	5.41E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.32E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.013
				Strontium	0.879	mg/kg	2.60E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.03E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0051
				Vanadium	0.059	mg/kg	1.75E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.04E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.041
				Zinc	16.2	mg/kg	4.79E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.59E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.19
			Exp. Route Total								0.E+00					5
	Exposure Medium Total										0.E+00					5
Medium Total											0.E+00					5
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				5

TABLE 7.11.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Arsenic	0.009	mg/kg	2.66E-06	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.E-06	3.11E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.10
				Barium	0.172	mg/kg	5.09E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.94E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0030
				Cadmium	0.018	mg/kg	5.33E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.21E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.12
				Cobalt	0.0162	mg/kg	4.79E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.59E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.19
				Copper	5.64	mg/kg	1.67E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.95E-02	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.49
				Manganese	0.508	mg/kg	1.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.013
				Mercury (methyl)	0.136	mg/kg	4.02E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.69E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.7
				Nickel	0.254	mg/kg	7.52E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.77E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.044
				Selenium	0.411	mg/kg	1.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.42E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.28
				Strontium	0.533	mg/kg	1.58E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.84E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0031
				Zinc	8.74	mg/kg	2.59E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.02E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.10
				PCB-1254	0.121	mg/kg	3.58E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-05	4.18E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	21.
				PCB-1260	0.309	mg/kg	9.14E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-04	1.07E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0154	mg/kg	4.56E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	5.32E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0093	mg/kg	2.75E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	9.E-07	3.21E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.064
				alpha-Chlordane	0.009	mg/kg	2.66E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	9.E-07	3.11E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.062
				gamma-Chlordane	0.0057	mg/kg	1.69E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-07	1.97E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.039
			Exp. Route Total								3.E-04					27
	Exposure Medium Total										3.E-04					27
Medium Total											3.E-04					27
							Total of Receptor Risks Across All Media				3.E-04	Total of Receptor Hazards Across All Media				27

TABLE 7.12.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach A	Ingestion													
				Copper	0.21	mg/kg	6.21E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.25E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.018
				Iron	17.47	mg/kg	5.17E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.03E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.086
				Manganese	0.218	mg/kg	6.45E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.53E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0054
				Mercury (methyl)	0.15152	mg/kg	4.48E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.23E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	5.2
				Selenium	0.536	mg/kg	1.59E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.85E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.37
				Strontium	0.327	mg/kg	9.68E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0019
				Zinc	9.51	mg/kg	2.81E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.28E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.11
			Exp. Route Total								0.E+00					6
	Exposure Medium Total										0.E+00					6
Medium Total											0.E+00					6
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				6

TABLE 7.13.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach B	Ingestion	Aluminum	0.231	mg/L	2.17E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.33E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0063
				Arsenic	0.0022	mg/L	2.07E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-05	6.03E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.20
				Barium	0.0492	mg/L	4.62E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.35E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0067
				Boron	0.0225	mg/L	2.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.16E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0031
				Chromium	0.0005	mg/L	4.70E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0046
				Copper	0.00125	mg/L	1.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.42E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00086
				Iron	0.193	mg/L	1.81E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.29E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0076
				Manganese	0.0674	mg/L	6.33E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.85E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.077
				Mercury	0.00019	mg/L	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.21E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.017
				Molybdenum	0.00101	mg/L	9.49E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.77E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0055
				Nickel	0.00062873	mg/L	5.91E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00086
				Selenium	0.00040471	mg/L	3.80E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0022
				Strontium	0.116	mg/L	1.09E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.18E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0053
				Vanadium	0.00169	mg/L	1.59E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.63E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0093
			Exp. Route Total								3.E-05					0.3
		Exposure Point Total									3.E-05					0.3
		Emory River Reach B	Dermal	Aluminum	0.231	mg/L	1.13E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.30E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000033
				Arsenic	0.0022	mg/L	1.08E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-07	3.15E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0010
				Barium	0.0492	mg/L	2.41E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.04E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000035
				Boron	0.0225	mg/L	1.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.22E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000016
				Chromium	0.0005	mg/L	2.45E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000024
				Copper	0.00125	mg/L	6.13E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.79E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000045
				Iron	0.193	mg/L	9.46E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.76E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000039
				Manganese	0.0674	mg/L	3.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.64E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00040
				Mercury	0.00019	mg/L	9.32E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.72E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000091
				Molybdenum	0.00101	mg/L	4.95E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000029
				Nickel	0.00062873	mg/L	6.17E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.80E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000090
				Selenium	0.00040471	mg/L	1.98E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.79E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000012
				Strontium	0.116	mg/L	5.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000028
				Vanadium	0.00169	mg/L	8.29E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000048
			Exp. Route Total								2.E-07					0.002
		Exposure Point Total									3.E-05					0.3
	Exposure Medium Total										3.E-05					0.3
Medium Total											3.E-05					0.3
							Total of Receptor Risks Across All Media				3.E-05	Total of Receptor Hazards Across All Media				0.3

TABLE 7.14.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach B	Ingestion	Aluminum	0.231	mg/L	1.27E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.48E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.015
				Arsenic	0.0022	mg/L	1.21E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-05	1.41E-04	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.47
				Barium	0.0492	mg/L	2.70E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.15E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.016
				Boron	0.0225	mg/L	1.23E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0072
				Chromium	0.0005	mg/L	2.74E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.20E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.011
				Copper	0.00125	mg/L	6.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.99E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0020
				Iron	0.193	mg/L	1.06E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.018
				Manganese	0.0674	mg/L	3.69E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.31E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.18
				Mercury	0.00019	mg/L	1.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.040
				Molybdenum	0.00101	mg/L	5.53E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.46E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.013
				Nickel	0.00062873	mg/L	3.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.02E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0020
				Selenium	0.00040471	mg/L	2.22E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0052
				Strontium	0.116	mg/L	6.36E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.42E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.012
				Vanadium	0.00169	mg/L	9.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.022
			Exp. Route Total								2.E-05					0.8
		Exposure Point Total									2.E-05					0.8
		Emory River Reach B	Dermal	Aluminum	0.231	mg/L	8.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.75E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000097
				Arsenic	0.0022	mg/L	7.96E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-07	9.28E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0031
				Barium	0.0492	mg/L	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00010
				Boron	0.0225	mg/L	8.14E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.49E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000047
				Chromium	0.0005	mg/L	1.81E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.11E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000070
				Copper	0.00125	mg/L	4.52E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.27E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000013
				Iron	0.193	mg/L	6.98E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.14E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.00012
				Manganese	0.0674	mg/L	2.44E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0012
				Mercury	0.00019	mg/L	6.87E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.02E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00027
				Molybdenum	0.00101	mg/L	3.65E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.26E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000085
				Nickel	0.00062873	mg/L	4.55E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.31E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000027
				Selenium	0.00040471	mg/L	1.46E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.71E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000034
				Strontium	0.116	mg/L	4.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.89E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000082
				Vanadium	0.00169	mg/L	6.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.13E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00014
			Exp. Route Total								1.E-07					0.005
		Exposure Point Total									2.E-05					0.8
	Exposure Medium Total										2.E-05					0.8
Medium Total											2.E-05					0.8
									Total of Receptor Risks Across All Media		2.E-05	Total of Receptor Hazards Across All Media				0.8

TABLE 7.15.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach B	Ingestion	Aluminum	21792	mg/kg	1.40E-03	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	4.09E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0041
				Antimony	2.26	mg/kg	1.46E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.25E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.0011
				Arsenic	31.33	mg/kg	2.02E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-06	5.89E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.020
				Barium	193.2	mg/kg	1.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.63E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00018
				Beryllium	1.417	mg/kg	9.13E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.66E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00013
				Boron	20.81	mg/kg	1.34E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.91E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000020
				Chromium	27.62	mg/kg	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.19E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0017
				Cobalt	18.42	mg/kg	1.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.46E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.012
				Copper	21.72	mg/kg	1.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00010
				Chromium VI	0.45	mg/kg	2.90E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.45E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000028
				Manganese	1381	mg/kg	8.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0019
				Mercury	0.078	mg/kg	5.02E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000049
				Nickel	25.82	mg/kg	1.66E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.85E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00024
				Selenium	3.64	mg/kg	2.34E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.84E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00014
				Strontium	119.6	mg/kg	7.70E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.25E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000037
				Vanadium	39.47	mg/kg	2.54E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.42E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0015
				Zinc	57.66	mg/kg	3.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000036
				Iron	26649	mg/kg	1.72E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.01E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0072
				Acenaphthene	0.0019	mg/kg	1.22E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-10	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.0
				Anthracene	0.021	mg/kg	1.35E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.95E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000000013
				Benzo(a)anthracene	0.055	mg/kg	3.54E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	1.03E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.061	mg/kg	3.93E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-08	1.15E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.09	mg/kg	5.80E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-09	1.69E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.065	mg/kg	4.19E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	3.E-10	1.22E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.08	mg/kg	5.15E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	4.E-11	1.50E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.01	mg/kg	6.44E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	5.E-09	1.88E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.074	mg/kg	4.77E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000035
				Fluorene	0.0041	mg/kg	2.64E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.70E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000019
				Indeno(1,2,3-cd)pyrene	0.028	mg/kg	1.80E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	5.26E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.006	mg/kg	3.86E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000056
				Phenanthrene	0.026	mg/kg	1.67E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.88E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000016
				Pyrene	0.071	mg/kg	4.57E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000044
				PCB-1254	0.0032	mg/kg	2.06E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-10	6.01E-10	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000030
				PCB-1260	0.0052	mg/kg	3.35E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-10	9.77E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0033	mg/kg	2.13E-10	mg/kg-day	3.4E-01	(mg/kg-day)-1	7.E-11	6.20E-10	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0000012
				beta-BHC	0.001	mg/kg	6.44E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	1.E-10	1.88E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000023
				Heptachlor	0.00055	mg/kg	3.54E-11	mg/kg-day	4.5E+00	(mg/kg-day)-1	2.E-10	1.03E-10	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00000021
			Exp. Route Total								3.E-06					0.05
			Dermal	Aluminum	21792	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	2.26	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	31.33	mg/kg	2.76E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	4.E-06	8.05E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.028
				Barium	193.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.417	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	20.81	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	27.62	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	18.42	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	21.72	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.45	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Manganese	1381	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.078	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	25.82	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Selenium	3.64	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-03	1/(mg/kg-day)	NA
				Strontium	119.6	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	39.47	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	57.66	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Iron	26649	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Acenaphthene	0.0019	mg/kg	7.25E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-09	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.000000035
				Anthracene	0.021	mg/kg	8.02E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-08	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000000078
				Benzo(a)anthracene	0.055	mg/kg	2.10E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-08	6.13E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.061	mg/kg	2.33E-08	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-07	6.79E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.09	mg/kg	3.44E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-08	1.00E-07	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.065	mg/kg	2.48E-08	mg/kg-day	7.3E-02	(mg/kg-day)-1	2.E-09	7.24E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.08	mg/kg	3.05E-08	mg/kg-day	7.3E-03	(mg/kg-day)-1	2.E-10	8.91E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.01	mg/kg	3.82E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-08	1.11E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.074	mg/kg	2.83E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.24E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000021
				Fluorene	0.0041	mg/kg	1.57E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.57E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000011
				Indeno(1,2,3-cd)pyrene	0.028	mg/kg	1.07E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-09	3.12E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.006	mg/kg	1.76E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.14E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000026
				Phenanthrene	0.026	mg/kg	7.64E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.23E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000074
				Pyrene	0.071	mg/kg	2.09E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.08E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.0000020
				PCB-1254	0.0032	mg/kg	1.32E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-09	3.84E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00019
				PCB-1260	0.0052	mg/kg	2.14E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-09	6.24E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0033	mg/kg	ND	mg/kg-day	3.4E-01	(mg/kg-day)-1	NA	ND	mg/kg-day	5.0E-04	1/(mg/kg-day)	NA
				beta-BHC	0.001	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				Heptachlor	0.00055	mg/kg	ND	mg/kg-day	4.5E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	5.0E-04	1/(mg/kg-day)	NA
			Exp. Route Total								5.E-06					0.03
		Exposure Point Total									8.E-06					0.08
	Exposure Medium Total										8.E-06					0.08
Medium Total											8.E-06					0.08
Surface Water	Surface Water	Emory River Reach B	Ingestion	Aluminum	0.231	mg/L	9.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.85E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000028
				Arsenic	0.0022	mg/L	9.30E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-07	2.71E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00090
				Barium	0.0492	mg/L	2.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.07E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000030
				Boron	0.0225	mg/L	9.51E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.77E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000014
				Chromium	0.0005	mg/L	2.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.16E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000021
				Copper	0.00125	mg/L	5.28E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.54E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000039
				Iron	0.193	mg/L	8.16E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000034
				Manganese	0.0674	mg/L	2.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.31E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00035
				Mercury	0.00019	mg/L	8.03E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000078
				Molybdenum	0.00101	mg/L	4.27E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000025
				Nickel	0.00062873	mg/L	2.66E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.75E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000039
				Selenium	0.00040471	mg/L	1.71E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.99E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000100
				Strontium	0.116	mg/L	4.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000024
				Vanadium	0.00169	mg/L	7.14E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000042
			Exp. Route Total								1.E-07					0.002
		Exposure Point Total									1.E-07					0.0
		Emory River Reach B	Dermal	Aluminum	0.231	mg/L	3.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.03E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000010
				Arsenic	0.0022	mg/L	3.35E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	5.E-08	9.76E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00034
				Barium	0.0492	mg/L	7.49E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.18E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00016
				Boron	0.0225	mg/L	3.42E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.99E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000050
				Chromium	0.0005	mg/L	7.61E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.22E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00057
				Copper	0.00125	mg/L	1.90E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.55E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000014
				Iron	0.193	mg/L	2.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.57E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000012
				Manganese	0.0674	mg/L	1.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.99E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0031
				Mercury	0.00019	mg/L	2.89E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.43E-09	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000035
				Molybdenum	0.00101	mg/L	1.54E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.48E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000090
				Nickel	0.00062873	mg/L	1.91E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.58E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000070
				Selenium	0.00040471	mg/L	6.16E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.80E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000045
				Strontium	0.116	mg/L	1.06E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.15E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000086
				Vanadium	0.00169	mg/L	2.57E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.50E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00058
			Exp. Route Total								5.E-08					0.005
	Exposure Medium Total										2.E-07					0.006
Medium Total											2.E-07					0.006
							Total of Receptor Risks Across All Media				8.E-06	Total of Receptor Hazards Across All Media				0.08

TABLE 7.16.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach B	Ingestion	Aluminum	21792	mg/kg	9.10E-04	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	7.64E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0076
				Antimony	2.26	mg/kg	9.44E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.93E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.0020
				Arsenic	31.33	mg/kg	1.31E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-06	1.10E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.037
				Barium	193.2	mg/kg	8.07E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.78E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00034
				Beryllium	1.417	mg/kg	5.92E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.97E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00025
				Boron	20.81	mg/kg	8.69E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.30E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000036
				Chromium	27.62	mg/kg	1.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.69E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0032
				Cobalt	18.42	mg/kg	7.69E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.46E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.022
				Copper	21.72	mg/kg	9.07E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.62E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00019
				Chromium VI	0.45	mg/kg	1.88E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.58E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000053
				Manganese	1381	mg/kg	5.77E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.84E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0035
				Mercury	0.078	mg/kg	3.26E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.74E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000091
				Nickel	25.82	mg/kg	1.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.05E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00045
				Selenium	3.64	mg/kg	1.52E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00026
				Strontium	119.6	mg/kg	4.99E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.19E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000070
				Vanadium	39.47	mg/kg	1.65E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0028
				Zinc	57.66	mg/kg	2.41E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.02E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000067
				Iron	26649	mg/kg	1.11E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.35E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.013
				Acenaphthene	0.0019	mg/kg	7.93E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.66E-10	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.000000011
				Anthracene	0.021	mg/kg	8.77E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.36E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000000025
				Benzo(a)anthracene	0.055	mg/kg	2.30E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	1.93E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.061	mg/kg	2.55E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-08	2.14E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.09	mg/kg	3.76E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	3.16E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.065	mg/kg	2.71E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	2.E-10	2.28E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.08	mg/kg	3.34E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	2.E-11	2.81E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.01	mg/kg	4.17E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-09	3.51E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.074	mg/kg	3.09E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.60E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000065
				Fluorene	0.0041	mg/kg	1.71E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000036
				Indeno(1,2,3-cd)pyrene	0.028	mg/kg	1.17E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	9.E-10	9.82E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.006	mg/kg	2.50E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.10E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000011
				Phenanthrene	0.026	mg/kg	1.09E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.12E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000030
				Pyrene	0.071	mg/kg	2.96E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.49E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000083
				PCB-1254	0.0032	mg/kg	1.34E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-10	1.12E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000056
				PCB-1260	0.0052	mg/kg	2.17E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-10	1.82E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0033	mg/kg	1.38E-10	mg/kg-day	3.4E-01	(mg/kg-day)-1	5.E-11	1.16E-09	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0000023
				beta-BHC	0.001	mg/kg	4.17E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	8.E-11	3.51E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000044
				Heptachlor	0.00055	mg/kg	2.30E-11	mg/kg-day	4.5E+00	(mg/kg-day)-1	1.E-10	1.93E-10	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00000039
			Exp. Route Total								2.E-06					0.1
			Dermal	Aluminum	21792	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	2.26	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	31.33	mg/kg	1.11E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-06	7.74E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.027
				Barium	193.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.417	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	20.81	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	27.62	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	18.42	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	21.72	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.45	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Manganese	1381	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.078	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	25.82	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Selenium	3.64	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-03	1/(mg/kg-day)	NA
				Strontium	119.6	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	39.47	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	57.66	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Iron	26649	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Acenaphthene	0.0019	mg/kg	2.91E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-09	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.000000034
				Anthracene	0.021	mg/kg	3.21E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.25E-08	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000000075
				Benzo(a)anthracene	0.055	mg/kg	8.41E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	6.E-09	5.89E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.061	mg/kg	9.33E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	7.E-08	6.53E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.09	mg/kg	1.38E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-08	9.63E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.065	mg/kg	9.94E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	7.E-10	6.96E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.08	mg/kg	1.22E-08	mg/kg-day	7.3E-03	(mg/kg-day)-1	9.E-11	8.56E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.01	mg/kg	1.53E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-08	1.07E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.074	mg/kg	1.13E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.92E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000020
				Fluorene	0.0041	mg/kg	6.27E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.39E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000011
				Indeno(1,2,3-cd)pyrene	0.028	mg/kg	4.28E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	3.00E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.006	mg/kg	7.06E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.94E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000025
				Phenanthrene	0.026	mg/kg	3.06E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000071
				Pyrene	0.071	mg/kg	8.35E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.85E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.0000019
				PCB-1254	0.0032	mg/kg	5.27E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	3.69E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00018
				PCB-1260	0.0052	mg/kg	8.56E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-09	5.99E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0033	mg/kg	ND	mg/kg-day	3.4E-01	(mg/kg-day)-1	NA	ND	mg/kg-day	5.0E-04	1/(mg/kg-day)	NA
				beta-BHC	0.001	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				Heptachlor	0.00055	mg/kg	ND	mg/kg-day	4.5E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	5.0E-04	1/(mg/kg-day)	NA
			Exp. Route Total								2.E-06					0.03
		Exposure Point Total									4.E-06					0.1
	Exposure Medium Total										4.E-06					0.1
Medium Total											4.E-06					0.1
Surface Water	Surface Water	Emory River Reach B	Ingestion	Aluminum	0.231	mg/L	6.33E-06	mg/kg-day	No toxicity value	$(mg/kg-day)^{-1}$	NA	4.43E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000044
				Arsenic	0.0022	mg/L	6.03E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	9.E-08	4.22E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0014
				Barium	0.0492	mg/L	1.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.44E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000047
				Boron	0.0225	mg/L	6.16E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.32E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000022
				Chromium	0.0005	mg/L	1.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.59E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000032
				Copper	0.00125	mg/L	3.42E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.40E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000060
				Iron	0.193	mg/L	5.29E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.70E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000053
				Manganese	0.0674	mg/L	1.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00054
				Mercury	0.00019	mg/L	5.21E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.64E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00012
				Molybdenum	0.00101	mg/L	2.77E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000039
				Nickel	0.00062873	mg/L	1.72E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000060
				Selenium	0.00040471	mg/L	1.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.76E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000016
				Strontium	0.116	mg/L	3.18E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.22E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000037
				Vanadium	0.00169	mg/L	4.63E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.24E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000065
			Exp. Route Total								9.E-08					0.002
		Exposure Point Total									9.E-08					0.002
		Emory River Reach B	Dermal	Aluminum	0.231	mg/L	1.86E-06	mg/kg-day	No toxicity value	$(mg/kg-day)^{-1}$	NA	1.30E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000013
				Arsenic	0.0022	mg/L	1.77E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	3.E-08	1.24E-07	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00043
				Barium	0.0492	mg/L	3.96E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.77E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00020
				Boron	0.0225	mg/L	1.81E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.27E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000063
				Chromium	0.0005	mg/L	4.02E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.81E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00072
				Copper	0.00125	mg/L	1.01E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.04E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000018
				Iron	0.193	mg/L	1.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000016
				Manganese	0.0674	mg/L	5.42E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.79E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0040
				Mercury	0.00019	mg/L	1.53E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-08	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000045
				Molybdenum	0.00101	mg/L	8.12E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.69E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000011
				Nickel	0.00062873	mg/L	1.01E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.08E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000088
				Selenium	0.00040471	mg/L	3.25E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.28E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000057
				Strontium	0.116	mg/L	9.33E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.53E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000011
				Vanadium	0.00169	mg/L	1.36E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.51E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00073
			Exp. Route Total								3.E-08					0.006
	Exposure Medium Total										1.E-07					0.009
Medium Total											1.E-07					0.009
									Total of Receptor Risks Across All Media		4.E-06		Total of Receptor Hazards Across All Media			0.1

TABLE 7.17.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach B	Ingestion													
				Cobalt	0.0161	mg/kg	5.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.19E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.040
				Copper	3.21	mg/kg	1.02E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.37E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.059
				Manganese	0.197	mg/kg	6.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0010
				Mercury (methyl)	0.1968	mg/kg	6.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.5
				Nickel	0.756	mg/kg	2.40E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.59E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.028
				Selenium	0.769	mg/kg	2.44E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.69E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.11
				Strontium	0.222	mg/kg	7.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.64E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00027
				Zinc	11	mg/kg	3.49E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.14E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.027
				PCB-1260	0.152	mg/kg	4.82E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.12E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0073	mg/kg	2.31E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-07	5.40E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								1.E-04					2
	Exposure Medium Total										1.E-04					2
Medium Total											1.E-04					2
									Total of Receptor Risks Across All Media		1.E-04		Total of Receptor Hazards Across All Media			2

TABLE 7.18.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach B	Ingestion													
				Barium	0.128	mg/kg	4.06E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.47E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00047
				Chromium	0.151	mg/kg	4.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.037
				Cobalt	0.016	mg/kg	5.07E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.039
				Copper	0.332	mg/kg	1.05E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.46E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0061
				Manganese	0.733	mg/kg	2.32E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.42E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0039
				Mercury (methyl)	0.1056	mg/kg	3.35E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.81E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.78
				Nickel	0.175	mg/kg	5.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0065
				Selenium	0.879	mg/kg	2.79E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.50E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.13
				Strontium	1.4	mg/kg	4.44E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0017
				Zinc	13.2	mg/kg	4.18E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.76E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.033
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1

TABLE 7.19.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion													
				Barium	0.0963	mg/kg	3.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.12E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00036
				Cobalt	0.0252	mg/kg	7.99E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.062
				Copper	0.481	mg/kg	1.52E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.56E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0089
				Manganese	0.533	mg/kg	1.69E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.94E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0028
				Mercury (methyl)	0.14064	mg/kg	4.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.0
				Nickel	0.1	mg/kg	3.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.40E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0037
				Selenium	0.404	mg/kg	1.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.99E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.060
				Strontium	0.648	mg/kg	2.05E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.79E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00080
				Zinc	6.9	mg/kg	2.19E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.10E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.017
				PCB-1254	0.0965	mg/kg	3.06E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-05	7.14E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	3.6
				PCB-1260	0.296	mg/kg	9.38E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-04	2.19E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0135	mg/kg	4.28E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	9.99E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0084	mg/kg	2.66E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	9.E-07	6.21E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.012
				alpha-Chlordane	0.0049	mg/kg	1.55E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	5.E-07	3.62E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0072
			Exp. Route Total								3.E-04					5
	Exposure Medium Total										3.E-04					5
Medium Total											3.E-04					5
									Total of Receptor Risks Across All Media		3.E-04		Total of Receptor Hazards Across All Media			5

TABLE 7.20.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach B	Ingestion													
				Copper	2.64	mg/kg	8.37E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.95E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.049
				Mercury (methyl)	0.2208	mg/kg	7.00E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.6
				Nickel	0.508	mg/kg	1.61E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.76E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.019
				Selenium	0.638	mg/kg	2.02E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.72E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.094
				Strontium	0.228	mg/kg	7.23E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.69E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00028
				Zinc	9.12	mg/kg	2.89E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.75E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
			Exp. Route Total								0.E+00					2
	Exposure Medium Total										0.E+00					2
Medium Total											0.E+00					2
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			2

TABLE 7.21.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Emory River Reach B	Ingestion													
				Cobalt	0.0161	mg/kg	4.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.56E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.19
				Copper	3.21	mg/kg	9.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-02	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.28
				Manganese	0.197	mg/kg	5.83E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.80E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0049
				Mercury (methyl)	0.1968	mg/kg	5.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.79E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	6.8
				Nickel	0.756	mg/kg	2.24E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.61E-03	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.13
				Selenium	0.769	mg/kg	2.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.53
				Strontium	0.222	mg/kg	6.57E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.66E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0013
				Zinc	11	mg/kg	3.25E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.80E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.13
				PCB-1260	0.152	mg/kg	4.50E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-05	5.25E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0073	mg/kg	2.16E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	7.E-07	2.52E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								9.E-05					8
	Exposure Medium Total										9.E-05					8
Medium Total											9.E-05					8
									Total of Receptor Risks Across All Media		9.E-05		Total of Receptor Hazards Across All Media			8

TABLE 7.22.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Emory River Reach B	Ingestion													
				Barium	0.128	mg/kg	3.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.42E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0022
				Chromium	0.151	mg/kg	4.47E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.21E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.17
				Cobalt	0.016	mg/kg	4.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.52E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.18
				Copper	0.332	mg/kg	9.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.15E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.029
				Manganese	0.733	mg/kg	2.17E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.018
				Mercury (methyl)	0.1056	mg/kg	3.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.65E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	3.6
				Nickel	0.175	mg/kg	5.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.04E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.030
				Selenium	0.879	mg/kg	2.60E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.03E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.61
				Strontium	1.4	mg/kg	4.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.83E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0081
				Zinc	13.2	mg/kg	3.91E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.56E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.15
			Exp. Route Total								0.E+00					5
	Exposure Medium Total										0.E+00					5
Medium Total											0.E+00					5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			5

TABLE 7.23.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion													
				Barium	0.0963	mg/kg	2.85E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.32E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0017
				Cobalt	0.0252	mg/kg	7.46E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.70E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.29
				Copper	0.481	mg/kg	1.42E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.042
				Manganese	0.533	mg/kg	1.58E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.84E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.013
				Mercury (methyl)	0.14064	mg/kg	4.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.85E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.9
				Nickel	0.1	mg/kg	2.96E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.45E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.017
				Selenium	0.404	mg/kg	1.20E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.28
				Strontium	0.648	mg/kg	1.92E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0037
				Zinc	6.9	mg/kg	2.04E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.079
				PCB-1254	0.0965	mg/kg	2.86E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-05	3.33E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	17.
				PCB-1260	0.296	mg/kg	8.76E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-04	1.02E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0135	mg/kg	3.99E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	4.66E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0084	mg/kg	2.49E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-07	2.90E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.058
				alpha-Chlordane	0.0049	mg/kg	1.45E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	5.E-07	1.69E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.034
			Exp. Route Total								2.E-04					22
	Exposure Medium Total										2.E-04					22
Medium Total											2.E-04					22
									Total of Receptor Risks Across All Media		2.E-04		Total of Receptor Hazards Across All Media			22

TABLE 7.24.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach B	Ingestion													
				Copper	2.64	mg/kg	7.81E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.11E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.23
				Mercury (methyl)	0.2208	mg/kg	6.53E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.62E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	7.6
				Nickel	0.508	mg/kg	1.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-03	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.088
				Selenium	0.638	mg/kg	1.89E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.20E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.44
				Strontium	0.228	mg/kg	6.75E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.87E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0013
				Zinc	9.12	mg/kg	2.70E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.15E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.10
			Exp. Route Total								0.E+00					8
	Exposure Medium Total										0.E+00					8
Medium Total											0.E+00					8
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			8

TABLE 7.25.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach C	Ingestion	Aluminum	0.218	mg/L	2.05E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.97E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0060
				Arsenic	0.00227	mg/L	2.13E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-05	6.22E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.21
				Barium	0.0537	mg/L	5.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0074
				Boron	0.0216	mg/L	2.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.92E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0030
				Chromium	0.00047	mg/L	4.41E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0043
				Cobalt	0.00046	mg/L	4.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.042
				Copper	0.00089991	mg/L	8.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.47E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00062
				Iron	0.227	mg/L	2.13E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.22E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0089
				Manganese	0.177	mg/L	1.66E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.85E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.20
				Molybdenum	0.00098626	mg/L	9.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.70E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0054
				Nickel	0.00069508	mg/L	6.53E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00095
				Strontium	0.111	mg/L	1.04E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.04E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0051
				Vanadium	0.00153	mg/L	1.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.19E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0084
			Exp. Route Total								3.E-05					0.5
		Exposure Point Total									3.E-05					0.5
		Emory River Reach C	Dermal	Aluminum	0.218	mg/L	1.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.12E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000031
				Arsenic	0.00227	mg/L	1.11E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-07	3.25E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0011
				Barium	0.0537	mg/L	2.63E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.68E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000038
				Boron	0.0216	mg/L	1.06E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000015
				Chromium	0.00047	mg/L	2.30E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.72E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000022
				Cobalt	0.00046	mg/L	2.26E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.58E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00022
				Copper	0.00089991	mg/L	4.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000032
				Iron	0.227	mg/L	1.11E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.25E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000046
				Manganese	0.177	mg/L	8.68E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0011
				Molybdenum	0.00098626	mg/L	4.84E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000028
				Nickel	0.00069508	mg/L	6.82E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.99E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000099
				Strontium	0.111	mg/L	5.44E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.59E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000026
				Vanadium	0.00153	mg/L	7.50E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.19E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000044
			Exp. Route Total								2.E-07					0.003
		Exposure Point Total									3.E-05					0.003
	Exposure Medium Total										3.E-05					0.5
Medium Total											3.E-05					0.5
									Total of Receptor Risks Across All Media		3.E-05		Total of Receptor Hazards Across All Media			0.5

TABLE 7.26.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach C	Ingestion	Aluminum	0.218	mg/L	1.19E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.014
				Arsenic	0.00227	mg/L	1.24E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-05	1.45E-04	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.48
				Barium	0.0537	mg/L	2.94E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.43E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.017
				Boron	0.0216	mg/L	1.18E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0069
				Chromium	0.00047	mg/L	2.58E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.00E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.010
				Cobalt	0.00046	mg/L	2.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.94E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.098
				Copper	0.00089991	mg/L	4.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.75E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0014
				Iron	0.227	mg/L	1.24E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.021
				Manganese	0.177	mg/L	9.70E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-02	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.47
				Molybdenum	0.00098626	mg/L	5.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.30E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.013
				Nickel	0.00069508	mg/L	3.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.44E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0022
				Strontium	0.111	mg/L	6.08E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.10E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.012
				Vanadium	0.00153	mg/L	8.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.78E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.020
			Exp. Route Total								2.E-05					1
		Exposure Point Total									2.E-05					1
		Emory River Reach C	Dermal	Aluminum	0.218	mg/L	7.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.20E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000092
				Arsenic	0.00227	mg/L	8.21E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-07	9.58E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0032
				Barium	0.0537	mg/L	1.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.27E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00011
				Boron	0.0216	mg/L	7.81E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.11E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000046
				Chromium	0.00047	mg/L	1.70E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.98E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000066
				Cobalt	0.00046	mg/L	1.66E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00065
				Copper	0.00089991	mg/L	3.25E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.80E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000095
				Iron	0.227	mg/L	8.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.58E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.00014
				Manganese	0.177	mg/L	6.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.47E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0031
				Molybdenum	0.00098626	mg/L	3.57E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.16E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000083
				Nickel	0.00069508	mg/L	5.03E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.87E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000029
				Strontium	0.111	mg/L	4.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.68E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000078
				Vanadium	0.00153	mg/L	5.53E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.46E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00013
			Exp. Route Total								1.E-07					0.008
		Exposure Point Total									2.E-05					1
	Exposure Medium Total										2.E-05					1
Medium Total											2.E-05					1
									Total of Receptor Risks Across All Media		2.E-05	Total of Receptor Hazards Across All Media				1

TABLE 7.27.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach C	Ingestion	Aluminum	16255	mg/kg	1.05E-03	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	3.05E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0031
				Arsenic	3.285	mg/kg	2.12E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-07	6.17E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0021
				Barium	239.2	mg/kg	1.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.49E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00022
				Beryllium	1.09	mg/kg	7.02E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.05E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00010
				Boron	10.3	mg/kg	6.63E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000097
				Chromium	16.28	mg/kg	1.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.06E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0010
				Cobalt	11.05	mg/kg	7.12E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0069
				Copper	8.035	mg/kg	5.18E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.51E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000038
				Manganese	1345	mg/kg	8.66E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0018
				Nickel	12.65	mg/kg	8.15E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00012
				Strontium	19.9	mg/kg	1.28E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.74E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000062
				Vanadium	19.47	mg/kg	1.25E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.66E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00073
				Zinc	50.19	mg/kg	3.23E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.43E-06	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000031
				Iron	19100	mg/kg	1.23E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.59E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0051
				Anthracene	0.0022	mg/kg	1.42E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.13E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000014
				Benzo(a)anthracene	0.019	mg/kg	1.22E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	9.E-10	3.57E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.021	mg/kg	1.35E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-08	3.95E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.036	mg/kg	2.32E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	6.76E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.023	mg/kg	1.48E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	1.E-10	4.32E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.027	mg/kg	1.74E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	1.E-11	5.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	2.00E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-09	5.82E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.049	mg/kg	3.16E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.21E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000023
				Fluorene	0.0024	mg/kg	1.55E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.51E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000011
				Indeno(1,2,3-cd)pyrene	0.011	mg/kg	7.09E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	5.E-10	2.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0088	mg/kg	5.67E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.65E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000083
				Phenanthrene	0.025	mg/kg	1.61E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.70E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000016
				Pyrene	0.041	mg/kg	2.64E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.70E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000026
				PCB-1254	0.0029	mg/kg	1.87E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-10	5.45E-10	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000027
				PCB-1260	0.0041	mg/kg	2.64E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-10	7.70E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								3.E-07					0.02
			Dermal	Aluminum	16255	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Arsenic	3.285	mg/kg	2.89E-07	mg/kg-day	1.6E+00	(mg/kg-day)-1	5.E-07	8.44E-07	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.0030
				Barium	239.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.09	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	10.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	16.28	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	11.05	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	8.035	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Manganese	1345	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Nickel	12.65	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Strontium	19.9	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	19.47	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	50.19	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	19100	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Anthracene	0.0022	mg/kg	8.40E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000082
				Benzo(a)anthracene	0.019	mg/kg	7.25E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	5.E-09	2.12E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.021	mg/kg	8.02E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	6.E-08	2.34E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.036	mg/kg	1.37E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-08	4.01E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.023	mg/kg	8.78E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	6.E-10	2.56E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.027	mg/kg	1.03E-08	mg/kg-day	7.3E-03	(mg/kg-day)-1	8.E-11	3.01E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	1.18E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	9.E-09	3.45E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.049	mg/kg	1.87E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.46E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000014
				Fluorene	0.0024	mg/kg	9.16E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.67E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000067
				Indeno(1,2,3-cd)pyrene	0.011	mg/kg	4.20E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	1.23E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0088	mg/kg	2.58E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.54E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000038

	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Phenanthrene	0.025	mg/kg	7.34E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000071
				Pyrene	0.041	mg/kg	1.20E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.51E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.0000012
				PCB-1254	0.0029	mg/kg	1.19E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-09	3.48E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00017
				PCB-1260	0.0041	mg/kg	1.69E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-09	4.92E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								5.E-07					0.003
		Exposure Point Total									9.E-07					0.02
	Exposure Medium Total										9.E-07					0.02
Medium Total											9.E-07					0.02
Surface Water	Surface Water	Emory River Reach C	Ingestion	Aluminum	0.218	mg/L	9.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.69E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000027
				Arsenic	0.00227	mg/L	9.60E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-07	2.80E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00093
				Barium	0.0537	mg/L	2.27E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.62E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000033
				Boron	0.0216	mg/L	9.13E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.66E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000013
				Chromium	0.00047	mg/L	1.99E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.79E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000019
				Cobalt	0.00046	mg/L	1.94E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.67E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00019
				Copper	0.00089991	mg/L	3.80E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000028
				Iron	0.227	mg/L	9.60E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.80E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000040
				Manganese	0.177	mg/L	7.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.18E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00091
				Molybdenum	0.00098626	mg/L	4.17E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.22E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000024
				Nickel	0.00069508	mg/L	2.94E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.57E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000043
				Strontium	0.111	mg/L	4.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000023
				Vanadium	0.00153	mg/L	6.47E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000038
			Exp. Route Total								1.E-07					0.002
		Exposure Point Total									1.E-07					0.002
		Emory River Reach C	Dermal	Aluminum	0.218	mg/L	3.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	9.68E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000097
				Arsenic	0.00227	mg/L	3.45E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	5.E-08	1.01E-07	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00035
				Barium	0.0537	mg/L	8.17E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00017
				Boron	0.0216	mg/L	3.29E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.59E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000048
				Chromium	0.00047	mg/L	7.15E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.09E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00053
				Cobalt	0.00046	mg/L	7.00E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00014
				Copper	0.00089991	mg/L	1.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.99E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000100
				Iron	0.227	mg/L	3.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.01E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000014
				Manganese	0.177	mg/L	2.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.86E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0082
				Molybdenum	0.00098626	mg/L	1.50E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.38E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000088
				Nickel	0.00069508	mg/L	2.12E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.17E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000077
				Strontium	0.111	mg/L	1.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.93E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000082
				Vanadium	0.00153	mg/L	2.33E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.79E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00052
			Exp. Route Total								5.E-08					0.01
	Exposure Medium Total										2.E-07					0.01
Medium Total											2.E-07					0.01
									Total of Receptor Risks Across All Media		1.E-06	Total of Receptor Hazards Across All Media				0.04

TABLE 7.28.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach C	Ingestion	Aluminum	16255	mg/kg	6.79E-04	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	5.70E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0057
				Arsenic	3.285	mg/kg	1.37E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-07	1.15E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0038
				Barium	239.2	mg/kg	9.99E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.39E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00042
				Beryllium	1.09	mg/kg	4.55E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.82E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00019
				Boron	10.3	mg/kg	4.30E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.61E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000018
				Chromium	16.28	mg/kg	6.80E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.71E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0019
				Cobalt	11.05	mg/kg	4.61E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.88E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.013
				Copper	8.035	mg/kg	3.35E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.82E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000070
				Manganese	1345	mg/kg	5.62E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.72E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0034
				Nickel	12.65	mg/kg	5.28E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.44E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00022
				Strontium	19.9	mg/kg	8.31E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.98E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000012
				Vanadium	19.47	mg/kg	8.13E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.83E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0014
				Zinc	50.19	mg/kg	2.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000059
				Iron	19100	mg/kg	7.97E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.70E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0096
				Anthracene	0.0022	mg/kg	9.18E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.72E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000026
				Benzo(a)anthracene	0.019	mg/kg	7.93E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	6.E-10	6.66E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.021	mg/kg	8.77E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	6.E-09	7.36E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.036	mg/kg	1.50E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	1.26E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.023	mg/kg	9.60E-10	mg/kg-day	7.3E-02	(mg/kg-day)-1	7.E-11	8.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.027	mg/kg	1.13E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	8.E-12	9.47E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	1.29E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	9.E-10	1.09E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.049	mg/kg	2.05E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000043
				Fluorene	0.0024	mg/kg	1.00E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.42E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000021
				Indeno(1,2,3-cd)pyrene	0.011	mg/kg	4.59E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	3.86E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0088	mg/kg	3.67E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000015
				Phenanthrene	0.025	mg/kg	1.04E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.77E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000029
				Pyrene	0.041	mg/kg	1.71E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000048
				PCB-1254	0.0029	mg/kg	1.21E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-10	1.02E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000051
				PCB-1260	0.0041	mg/kg	1.71E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-10	1.44E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								2.E-07					0.04
			Dermal	Aluminum	16255	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Arsenic	3.285	mg/kg	1.16E-07	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-07	8.11E-07	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.0028
				Barium	239.2	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.09	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	10.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	16.28	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	11.05	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	8.035	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Manganese	1345	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Nickel	12.65	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Strontium	19.9	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	19.47	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	50.19	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	19100	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Anthracene	0.0022	mg/kg	3.36E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.35E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0000000078
				Benzo(a)anthracene	0.019	mg/kg	2.91E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	2.03E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.021	mg/kg	3.21E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-08	2.25E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.036	mg/kg	5.51E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-09	3.85E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.023	mg/kg	3.52E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	3.E-10	2.46E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.027	mg/kg	4.13E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	3.E-11	2.89E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	4.74E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-09	3.32E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.049	mg/kg	7.49E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.25E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000013
				Fluorene	0.0024	mg/kg	3.67E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000064
				Indeno(1,2,3-cd)pyrene	0.011	mg/kg	1.68E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	1.18E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0088	mg/kg	1.04E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.25E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000036

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Phenanthrene	0.025	mg/kg	2.94E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.06E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000069
				Pyrene	0.041	mg/kg	4.82E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.38E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.0000011
				PCB-1254	0.0029	mg/kg	4.78E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	3.34E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00017
				PCB-1260	0.0041	mg/kg	6.75E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	4.73E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								2.E-07					0.003
		Exposure Point Total									4.E-07					0.04
	Exposure Medium Total										4.E-07					0.04
Medium Total											4.E-07					0.04
Surface Water	Surface Water	Emory River Reach C	Ingestion	Aluminum	0.218	mg/L	5.97E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	4.18E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000042
				Arsenic	0.00227	mg/L	6.22E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	9.E-08	4.35E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0015
				Barium	0.0537	mg/L	1.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000051
				Boron	0.0216	mg/L	5.92E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.14E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000021
				Chromium	0.00047	mg/L	1.29E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.01E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000030
				Cobalt	0.00046	mg/L	1.26E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.82E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00029
				Copper	0.00089991	mg/L	2.47E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.73E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000043
				Iron	0.227	mg/L	6.22E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.35E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000062
				Manganese	0.177	mg/L	4.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.39E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0014
				Molybdenum	0.00098626	mg/L	2.70E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000038
				Nickel	0.00069508	mg/L	1.90E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000067
				Strontium	0.111	mg/L	3.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.13E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000035
				Vanadium	0.00153	mg/L	4.19E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.93E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000059
			Exp. Route Total								9.E-08					0.004
		Exposure Point Total									9.E-08					0.004
		Emory River Reach C	Dermal	Aluminum	0.218	mg/L	1.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.23E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000012
				Arsenic	0.00227	mg/L	1.83E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	3.E-08	1.28E-07	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00045
				Barium	0.0537	mg/L	4.32E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.02E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00022
				Boron	0.0216	mg/L	1.74E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.22E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000061
				Chromium	0.00047	mg/L	3.78E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00068
				Cobalt	0.00046	mg/L	3.70E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000086
				Copper	0.00089991	mg/L	7.24E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.07E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000013
				Iron	0.227	mg/L	1.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000018
				Manganese	0.177	mg/L	1.42E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.96E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.010
				Molybdenum	0.00098626	mg/L	7.93E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.55E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000011
				Nickel	0.00069508	mg/L	1.12E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.82E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000098
				Strontium	0.111	mg/L	8.93E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.25E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000010
				Vanadium	0.00153	mg/L	1.23E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.61E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00066
			Exp. Route Total								3.E-08					0.01
	Exposure Medium Total										1.E-07					0.02
Medium Total											1.E-07					0.02
									Total of Receptor Risks Across All Media		6.E-07		Total of Receptor Hazards Across All Media			0.1

TABLE 7.29.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach C	Ingestion													
				Barium	0.108	mg/kg	3.42E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.99E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00040
				Chromium	0.143	mg/kg	4.53E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.035
				Copper	2.91	mg/kg	9.23E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.15E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.054
				Manganese	0.421	mg/kg	1.33E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.11E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0022
				Mercury (methyl)	0.224	mg/kg	7.10E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.7
				Nickel	0.255	mg/kg	8.08E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0094
				Selenium	0.64	mg/kg	2.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.73E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.095
				Strontium	1.96	mg/kg	6.21E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0024
				Zinc	11.6	mg/kg	3.68E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.58E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.029
				PCB-1254	0.213	mg/kg	6.75E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.58E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	7.9
				PCB-1260	0.497	mg/kg	1.58E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-04	3.68E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0278	mg/kg	8.81E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-06	2.06E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0134	mg/kg	4.25E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	9.91E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.020
				alpha-Chlordane	0.0094	mg/kg	2.98E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	6.95E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.014
				Heptachlor	0.004	mg/kg	1.27E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-06	2.96E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0059
			Exp. Route Total								5.E-04					10
	Exposure Medium Total										5.E-04					10
Medium Total											5.E-04					10
									Total of Receptor Risks Across All Media		5.E-04		Total of Receptor Hazards Across All Media			10

TABLE 7.30.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach C	Ingestion													
				Aluminum	7	mg/kg	2.22E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0052
				Barium	0.221	mg/kg	7.01E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00082
				Cobalt	0.0219	mg/kg	6.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.62E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.054
				Copper	0.326	mg/kg	1.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.41E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0060
				Iron	12.6	mg/kg	3.99E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.32E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.013
				Manganese	2.46	mg/kg	7.80E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.82E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.013
				Mercury (methyl)	0.07328	mg/kg	2.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.42E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.54
				Selenium	0.613	mg/kg	1.94E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.53E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.091
				Strontium	1.91	mg/kg	6.06E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0024
				Zinc	14.8	mg/kg	4.69E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.036
			Exp. Route Total								0.E+00					0.8
	Exposure Medium Total										0.E+00					0.8
Medium Total											0.E+00					0.8
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.8

TABLE 7.31.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach C	Ingestion													
				Barium	0.336	mg/kg	1.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.49E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0012
				Cobalt	0.035	mg/kg	1.11E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.086
				Copper	1.04	mg/kg	3.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.69E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.019
				Manganese	2.44	mg/kg	7.74E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.80E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.013
				Mercury (methyl)	0.2352	mg/kg	7.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.74E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.7
				Nickel	0.257	mg/kg	8.15E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0095
				Selenium	0.272	mg/kg	8.62E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.01E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.040
				Strontium	2.01	mg/kg	6.37E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.49E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0025
				Zinc	9	mg/kg	2.85E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.66E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
				PCB-1260	1.12	mg/kg	3.55E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-04	8.28E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0168	mg/kg	5.33E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.24E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0202	mg/kg	6.40E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.49E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.030
				alpha-Chlordane	0.0031	mg/kg	9.83E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	3.E-07	2.29E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0046
			Exp. Route Total								7.E-04					2
	Exposure Medium Total										7.E-04					2
Medium Total											7.E-04					2
									Total of Receptor Risks Across All Media		7.E-04			Total of Receptor Hazards Across All Media		2

TABLE 7.32.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach C	Ingestion													
				Barium	0.108	mg/kg	3.20E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.73E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0019
				Chromium	0.143	mg/kg	4.23E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.94E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.16
				Copper	2.91	mg/kg	8.61E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.00E-02	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.25
				Manganese	0.421	mg/kg	1.25E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.010
				Mercury (methyl)	0.224	mg/kg	6.63E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.73E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	7.7
				Nickel	0.255	mg/kg	7.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.80E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.044
				Selenium	0.64	mg/kg	1.89E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.21E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.44
				Strontium	1.96	mg/kg	5.80E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.77E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.011
				Zinc	11.6	mg/kg	3.43E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.00E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.13
				PCB-1254	0.213	mg/kg	6.30E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	7.35E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	37.
				PCB-1260	0.497	mg/kg	1.47E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-04	1.72E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0278	mg/kg	8.23E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-06	9.60E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0134	mg/kg	3.96E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	4.63E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.093
				alpha-Chlordane	0.0094	mg/kg	2.78E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	3.24E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.065
				Heptachlor	0.004	mg/kg	1.18E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	1.38E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.028
			Exp. Route Total								4.E-04					46
	Exposure Medium Total										4.E-04					46
Medium Total											4.E-04					46
									Total of Receptor Risks Across All Media		4.E-04	Total of Receptor Hazards Across All Media				46

TABLE 7.33.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach C	Ingestion													
				Aluminum	7	mg/kg	2.07E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.024
				Barium	0.221	mg/kg	6.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.63E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0038
				Cobalt	0.0219	mg/kg	6.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.56E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.25
				Copper	0.326	mg/kg	9.65E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.028
				Iron	12.6	mg/kg	3.73E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.35E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.062
				Manganese	2.46	mg/kg	7.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.49E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.061
				Mercury (methyl)	0.07328	mg/kg	2.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	2.5
				Selenium	0.613	mg/kg	1.81E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.42
				Strontium	1.91	mg/kg	5.65E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.59E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.011
				Zinc	14.8	mg/kg	4.38E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.11E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.17
			Exp. Route Total								0.E+00					4
	Exposure Medium Total										0.E+00					4
Medium Total											0.E+00					4
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				4

TABLE 7.34.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach C	Ingestion													
				Barium	0.336	mg/kg	9.94E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.16E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0058
				Cobalt	0.035	mg/kg	1.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-04	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.40
				Copper	1.04	mg/kg	3.08E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.59E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.090
				Manganese	2.44	mg/kg	7.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.42E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.060
				Mercury (methyl)	0.2352	mg/kg	6.96E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.12E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	8.1
				Nickel	0.257	mg/kg	7.60E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.87E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.044
				Selenium	0.272	mg/kg	8.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.39E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.19
				Strontium	2.01	mg/kg	5.95E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.94E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.012
				Zinc	9	mg/kg	2.66E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.11E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.10
				PCB-1260	1.12	mg/kg	3.31E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-04	3.87E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0168	mg/kg	4.97E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	5.80E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0202	mg/kg	5.98E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	6.97E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.14
				alpha-Chlordane	0.0031	mg/kg	9.17E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	3.E-07	1.07E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.021
			Exp. Route Total								7.E-04					9
	Exposure Medium Total										7.E-04					9
Medium Total											7.E-04					9
							Total of Receptor Risks Across All Media				7.E-04	Total of Receptor Hazards Across All Media				9

TABLE 7.35.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Off-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Arsenic	0.00089238	mg/L	8.38E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-05	2.44E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.081
				Barium	0.0505	mg/L	4.74E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0069
				Boron	0.0189	mg/L	1.78E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0026
				Chromium	0.00041	mg/L	3.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0037
				Copper	0.00050124	mg/L	4.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00034
				Iron	0.106	mg/L	9.96E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.90E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0041
				Manganese	0.128	mg/L	1.20E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.51E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.15
				Mercury	0.00017	mg/L	1.60E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.66E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.016
				Nickel	0.00060735	mg/L	5.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00083
				Selenium	0.00038	mg/L	3.57E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0021
				Strontium	0.102	mg/L	9.58E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.79E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0047
			Exp. Route Total								1.E-05					0.3
		Exposure Point Total									1.E-05					0.3
		Emory River Reference Reach	Dermal	Arsenic	0.00089238	mg/L	4.38E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-08	1.28E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00043
				Barium	0.0505	mg/L	2.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.22E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000036
				Boron	0.0189	mg/L	9.27E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.70E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000014
				Chromium	0.00041	mg/L	2.01E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.86E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000020
				Copper	0.00050124	mg/L	2.46E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.17E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000018
				Iron	0.106	mg/L	5.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000022
				Manganese	0.128	mg/L	6.28E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.83E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00076
				Mercury	0.00017	mg/L	8.34E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000081
				Nickel	0.00060735	mg/L	5.96E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.74E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000087
				Selenium	0.00038	mg/L	1.86E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.43E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000011
				Strontium	0.102	mg/L	5.00E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000024
			Exp. Route Total								7.E-08					0.001
		Exposure Point Total									1.E-05					0.3
	Exposure Medium Total										1.E-05					0.3
Medium Total											1.E-05					0.3
							Total of Receptor Risks Across All Media				1.E-05	Total of Receptor Hazards Across All Media				0.3

TABLE 7.36.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Off-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Arsenic	0.00089238	mg/L	4.89E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-06	5.70E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.19
				Barium	0.0505	mg/L	2.77E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.23E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.016
				Boron	0.0189	mg/L	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0060
				Chromium	0.00041	mg/L	2.25E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.62E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0087
				Copper	0.00050124	mg/L	2.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.20E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00080
				Iron	0.106	mg/L	5.81E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.78E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0097
				Manganese	0.128	mg/L	7.01E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.18E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.34
				Mercury	0.00017	mg/L	9.32E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.036
				Nickel	0.00060735	mg/L	3.33E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.88E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0019
				Selenium	0.00038	mg/L	2.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0049
				Strontium	0.102	mg/L	5.59E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.52E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.011
			Exp. Route Total								7.E-06					0.6
		Exposure Point Total									7.E-06					0.6
		Emory River Reference Reach	Dermal	Arsenic	0.00089238	mg/L	3.23E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-08	3.77E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0013
				Barium	0.0505	mg/L	1.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.13E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00011
				Boron	0.0189	mg/L	6.84E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.97E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000040
				Chromium	0.00041	mg/L	1.48E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.73E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000058
				Copper	0.00050124	mg/L	1.81E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.11E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000053
				Iron	0.106	mg/L	3.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.47E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000064
				Manganese	0.128	mg/L	4.63E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.40E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0023
				Mercury	0.00017	mg/L	6.15E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.17E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00024
				Nickel	0.00060735	mg/L	4.39E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.13E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000026
				Selenium	0.00038	mg/L	1.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000032
				Strontium	0.102	mg/L	3.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.30E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000072
			Exp. Route Total								5.E-08					0.004
		Exposure Point Total									7.E-06					0.004
	Exposure Medium Total										7.E-06					0.6
Medium Total											7.E-06					0.6
									Total of Receptor Risks Across All Media		7.E-06		Total of Receptor Hazards Across All Media			0.6

TABLE 7.37.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reference Reach	Ingestion	Aluminum	14800	mg/kg	9.53E-04	mg/kg-day	No toxicity value	$(mg/kg-day)^{-1}$	NA	2.78E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0028
				Arsenic	5.4	mg/kg	3.48E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-07	1.01E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0034
				Barium	90.4	mg/kg	5.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.70E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000085
				Beryllium	0.769	mg/kg	4.95E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.000072
				Chromium	13.8	mg/kg	8.89E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.00086
				Cobalt	10.5	mg/kg	6.76E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.97E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0066
				Copper	6.83	mg/kg	4.40E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000032
				Chromium VI	0.37	mg/kg	2.38E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.95E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000023
				Manganese	689	mg/kg	4.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00092
				Strontium	16.3	mg/kg	1.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.06E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000051
				Vanadium	26.3	mg/kg	1.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.94E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00099
				Zinc	54.1	mg/kg	3.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000034
				Iron	18500	mg/kg	1.19E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.48E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0050
				Anthracene	0.0023	mg/kg	1.48E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.32E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.016	mg/kg	1.03E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-10	3.01E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.016	mg/kg	1.03E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	8.E-09	3.01E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.028	mg/kg	1.80E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	5.26E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.017	mg/kg	1.09E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	8.E-11	3.19E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.019	mg/kg	1.22E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	9.E-12	3.57E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	1.42E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-09	4.13E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.034	mg/kg	2.19E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.39E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000016
				Fluorene	0.0022	mg/kg	1.42E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.13E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000010
				Indeno(1,2,3-cd)pyrene	0.0068	mg/kg	4.38E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	1.28E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0039	mg/kg	2.51E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.33E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000037
				Phenanthrene	0.017	mg/kg	1.09E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.19E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000011
				Pyrene	0.033	mg/kg	2.13E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.20E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000021
				PCB-1254	0.0032	mg/kg	2.06E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-10	6.01E-10	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000030
				PCB-1260	0.0046	mg/kg	2.96E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-10	8.64E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00073	mg/kg	4.70E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	8.E-11	1.37E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000017
			Exp. Route Total								5.E-07					0.02
			Dermal	Aluminum	14800	mg/kg	ND	mg/kg-day	No toxicity value	$(mg/kg-day)^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Arsenic	5.4	mg/kg	4.76E-07	mg/kg-day	1.6E+00	(mg/kg-day)-1	8.E-07	1.39E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.0049
				Barium	90.4	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	0.769	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Chromium	13.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	10.5	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	6.83	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.37	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Manganese	689	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Strontium	16.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	26.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	54.1	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	18500	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Anthracene	0.0023	mg/kg	8.78E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.56E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.016	mg/kg	6.11E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-09	1.78E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.016	mg/kg	6.11E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	4.E-08	1.78E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.028	mg/kg	1.07E-08	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-09	3.12E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.017	mg/kg	6.49E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	5.E-10	1.89E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.019	mg/kg	7.25E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	5.E-11	2.12E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	8.40E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	6.E-09	2.45E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.034	mg/kg	1.30E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.79E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000095
				Fluorene	0.0022	mg/kg	8.40E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000061
				Indeno(1,2,3-cd)pyrene	0.0068	mg/kg	2.60E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	7.57E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Naphthalene	0.0039	mg/kg	1.15E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.34E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000017
				Phenanthrene	0.017	mg/kg	4.99E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000049
				Pyrene	0.033	mg/kg	9.69E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.83E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000094
				PCB-1254	0.0032	mg/kg	1.32E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-09	3.84E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00019
				PCB-1260	0.0046	mg/kg	1.89E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-09	5.52E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00073	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
			Exp. Route Total								8.E-07					0.005
		Exposure Point Total									1.E-06					0.03
	Exposure Medium Total										1.E-06					0.03
Medium Total											1.E-06					0.03
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Arsenic	0.00089238	mg/L	3.77E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-08	1.10E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00037
				Barium	0.0505	mg/L	2.13E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.23E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000031
				Boron	0.0189	mg/L	7.99E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.33E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000012
				Chromium	0.00041	mg/L	1.73E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.05E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000017
				Copper	0.00050124	mg/L	2.12E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.18E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000015
				Iron	0.106	mg/L	4.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.31E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000019
				Manganese	0.128	mg/L	5.41E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.58E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00066
				Mercury	0.00017	mg/L	7.19E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.10E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000070
				Nickel	0.00060735	mg/L	2.57E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.49E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000037
				Selenium	0.00038	mg/L	1.61E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.68E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000094
				Strontium	0.102	mg/L	4.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000021
			Exp. Route Total								6.E-08					0.001
		Exposure Point Total									6.E-08					0.001
		Emory River Reference Reach	Dermal	Arsenic	0.00089238	mg/L	1.36E-08	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08	3.96E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00014
				Barium	0.0505	mg/L	7.68E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00016
				Boron	0.0189	mg/L	2.88E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.39E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000042
				Chromium	0.00041	mg/L	6.24E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.82E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00047
				Copper	0.00050124	mg/L	7.63E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.22E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000056
				Iron	0.106	mg/L	1.61E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.70E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000067
				Manganese	0.128	mg/L	1.95E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.68E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0059
				Mercury	0.00017	mg/L	2.59E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.55E-09	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000031
				Nickel	0.00060735	mg/L	1.85E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.39E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000067
				Selenium	0.00038	mg/L	5.78E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.69E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000042
				Strontium	0.102	mg/L	9.31E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.53E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000075
			Exp. Route Total								2.E-08					0.007
	Exposure Medium Total										8.E-08					0.008
Medium Total											8.E-08					0.008
									Total of Receptor Risks Across All Media		1.E-06		Total of Receptor Hazards Across All Media			0.03

TABLE 7.38.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reference Reach	Ingestion	Aluminum	14800	mg/kg	6.18E-04	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	5.19E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0052
				Arsenic	5.4	mg/kg	2.25E-07	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-07	1.89E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0063
				Barium	90.4	mg/kg	3.77E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.17E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00016
				Beryllium	0.769	mg/kg	3.21E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.70E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00013
				Chromium	13.8	mg/kg	5.76E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.84E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0016
				Cobalt	10.5	mg/kg	4.38E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.68E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.012
				Copper	6.83	mg/kg	2.85E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.40E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000060
				Chromium VI	0.37	mg/kg	1.54E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.30E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000043
				Manganese	689	mg/kg	2.88E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0017
				Strontium	16.3	mg/kg	6.80E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.72E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000095
				Vanadium	26.3	mg/kg	1.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.22E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0018
				Zinc	54.1	mg/kg	2.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000063
				Iron	18500	mg/kg	7.72E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.49E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0093
				Anthracene	0.0023	mg/kg	9.60E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.07E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.016	mg/kg	6.68E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	5.E-10	5.61E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.016	mg/kg	6.68E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	5.E-09	5.61E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.028	mg/kg	1.17E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	9.E-10	9.82E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.017	mg/kg	7.10E-10	mg/kg-day	7.3E-02	(mg/kg-day)-1	5.E-11	5.96E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.019	mg/kg	7.93E-10	mg/kg-day	7.3E-03	(mg/kg-day)-1	6.E-12	6.66E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	9.18E-11	mg/kg-day	7.3E+00	(mg/kg-day)-1	7.E-10	7.72E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.034	mg/kg	1.42E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.19E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000030
				Fluorene	0.0022	mg/kg	9.18E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.72E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000019
				Indeno(1,2,3-cd)pyrene	0.0068	mg/kg	2.84E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-10	2.38E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0039	mg/kg	1.63E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000068
				Phenanthrene	0.017	mg/kg	7.10E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.96E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000020
				Pyrene	0.033	mg/kg	1.38E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.16E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000039
				PCB-1254	0.0032	mg/kg	1.34E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-10	1.12E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000056
				PCB-1260	0.0046	mg/kg	1.92E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-10	1.61E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00073	mg/kg	3.05E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	5.E-11	2.56E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000032
			Exp. Route Total								3.E-07					0.04
			Dermal	Aluminum	14800	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Arsenic	5.4	mg/kg	1.91E-07	mg/kg-day	1.6E+00	(mg/kg-day)-1	3.E-07	1.33E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.0047
				Barium	90.4	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	0.769	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Chromium	13.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	10.5	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	6.83	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.37	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Manganese	689	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Strontium	16.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	26.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	54.1	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	18500	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Anthracene	0.0023	mg/kg	3.52E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.46E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.016	mg/kg	2.45E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	1.71E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.016	mg/kg	2.45E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-08	1.71E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.028	mg/kg	4.28E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	3.00E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.017	mg/kg	2.60E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	2.E-10	1.82E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.019	mg/kg	2.91E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	2.E-11	2.03E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	3.36E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-09	2.35E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.034	mg/kg	5.20E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.64E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000091
				Fluorene	0.0022	mg/kg	3.36E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.35E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000059
				Indeno(1,2,3-cd)pyrene	0.0068	mg/kg	1.04E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	8.E-10	7.28E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Naphthalene	0.0039	mg/kg	4.59E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.21E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000016
				Phenanthrene	0.017	mg/kg	2.00E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000047
				Pyrene	0.033	mg/kg	3.88E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.72E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000091
				PCB-1254	0.0032	mg/kg	5.27E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	3.69E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00018
				PCB-1260	0.0046	mg/kg	7.58E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-09	5.30E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00073	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
			Exp. Route Total								3.E-07					0.005
		Exposure Point Total									7.E-07					0.04
	Exposure Medium Total										7.E-07					0.04
Medium Total											7.E-07					0.04
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Arsenic	0.00089238	mg/L	2.44E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-08	1.71E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00057
				Barium	0.0505	mg/L	1.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.68E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000048
				Boron	0.0189	mg/L	5.18E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.62E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000018
				Chromium	0.00041	mg/L	1.12E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.86E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000026
				Copper	0.00050124	mg/L	1.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.61E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000024
				Iron	0.106	mg/L	2.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000029
				Manganese	0.128	mg/L	3.51E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0010
				Mercury	0.00017	mg/L	4.66E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00011
				Nickel	0.00060735	mg/L	1.66E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.16E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000058
				Selenium	0.00038	mg/L	1.04E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.29E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000015
				Strontium	0.102	mg/L	2.79E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.96E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000033
			Exp. Route Total								4.E-08					0.002
		Exposure Point Total									4.E-08					0.002
		Emory River Reference Reach	Dermal	Arsenic	0.00089238	mg/L	7.18E-09	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08	5.02E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00018
				Barium	0.0505	mg/L	4.06E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00020
				Boron	0.0189	mg/L	1.52E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000053
				Chromium	0.00041	mg/L	3.30E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.31E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00059
				Copper	0.00050124	mg/L	4.03E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.82E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000071
				Iron	0.106	mg/L	8.52E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.97E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000085
				Manganese	0.128	mg/L	1.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.20E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0075
				Mercury	0.00017	mg/L	1.37E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.57E-09	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000040
				Nickel	0.00060735	mg/L	9.77E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.84E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000085
				Selenium	0.00038	mg/L	3.06E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000053
				Strontium	0.102	mg/L	8.20E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.74E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000096
			Exp. Route Total								1.E-08					0.009
	Exposure Medium Total										5.E-08					0.01
Medium Total											5.E-08					0.01
									Total of Receptor Risks Across All Media		7.E-07		Total of Receptor Hazards Across All Media			0.05

TABLE 7.39.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion													
				Copper	0.351	mg/kg	1.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.60E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0065
				Manganese	0.205	mg/kg	6.50E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0011
				Mercury (methyl)	0.2576	mg/kg	8.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.91E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.9
				Selenium	0.498	mg/kg	1.58E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.68E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.074
				Strontium	0.245	mg/kg	7.77E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.81E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00030
				Zinc	11.1	mg/kg	3.52E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.21E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.027
				PCB-1260	0.105	mg/kg	3.33E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-05	7.77E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								7.E-05					2.0
	Exposure Medium Total										7.E-05					2.0
Medium Total											7.E-05					2.0
							Total of Receptor Risks Across All Media				7.E-05	Total of Receptor Hazards Across All Media				2.0

TABLE 7.40.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reference Reach	Ingestion	Barium	0.30	mg/kg	9.64E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.25E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0011
				Chromium	0.67	mg/kg	2.12E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.96E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.17
				Copper	0.315	mg/kg	9.99E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.33E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0058
				Manganese	3.57	mg/kg	1.13E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.64E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.019
				Mercury (methyl)	0.12704	mg/kg	4.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.40E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.94
				Nickel	0.35	mg/kg	1.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.013
				Selenium	0.602	mg/kg	1.91E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.45E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.089
			Exp. Route Total								0.E+00					1.2
	Exposure Medium Total										0.E+00					1.2
Medium Total											0.E+00					1.2
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				1.2

TABLE 7.41.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Barium	0.11	mg/kg	3.39E-05	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	7.92E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00040
				Copper	0.36	mg/kg	1.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.66E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0067
				Manganese	0.482	mg/kg	1.53E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0025
				Mercury (methyl)	0.2384	mg/kg	7.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.8
				Nickel	0.198	mg/kg	6.28E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0073
				Selenium	0.258	mg/kg	8.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.91E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.038
				Strontium	0.618	mg/kg	1.96E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.57E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00076
				Zinc	8.36	mg/kg	2.65E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.18E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.021
				PCB-1254	0.141	mg/kg	4.47E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-05	1.04E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	5.2
				PCB-1260	0.494	mg/kg	1.57E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-04	3.65E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0206	mg/kg	6.53E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.52E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0107	mg/kg	3.39E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	7.92E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.016
				alpha-Chlordane	0.0092	mg/kg	2.92E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	6.81E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.014
				gamma-Chlordane	0.0063	mg/kg	2.00E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-07	4.66E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0093
			Exp. Route Total								4.E-04					7
	Exposure Medium Total										4.E-04					7
Medium Total											4.E-04					7
									Total of Receptor Risks Across All Media		4.E-04		Total of Receptor Hazards Across All Media			7

TABLE 7.42.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reference Reach	Ingestion													
				Barium	0.118	mg/kg	3.74E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.73E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00044
				Chromium	0.145	mg/kg	4.60E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.036
				Copper	0.238	mg/kg	7.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0044
				Manganese	0.473	mg/kg	1.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.50E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0025
				Mercury (methyl)	0.09824	mg/kg	3.11E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.27E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.73
				Selenium	0.374	mg/kg	1.19E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.77E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.055
				Strontium	1.694	mg/kg	5.37E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0021
				Zinc	20	mg/kg	6.34E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.48E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.049
			Exp. Route Total								0.E+00					0.9
	Exposure Medium Total										0.E+00					0.9
Medium Total											0.E+00					0.9
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.9

TABLE 7.43.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Emory River Reference Reach	Ingestion													
				Copper	0.351	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.030
				Manganese	0.205	mg/kg	6.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.08E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0051
				Mercury (methyl)	0.2576	mg/kg	7.62E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.89E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	8.9
				Selenium	0.498	mg/kg	1.47E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.34
				Strontium	0.245	mg/kg	7.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.46E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0014
				Zinc	11.1	mg/kg	3.28E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.83E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.13
				PCB-1260	0.105	mg/kg	3.11E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-05	3.62E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								6.E-05					9
	Exposure Medium Total										6.E-05					9
Medium Total											6.E-05					9
								Total of Receptor Risks Across All Media			6.E-05	Total of Receptor Hazards Across All Media				9

TABLE 7.44.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Emory River Reference Reach	Ingestion	Barium	0.30	mg/kg	9.00E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0052
				Chromium	0.67	mg/kg	1.98E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.31E-03	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.77
				Copper	0.315	mg/kg	9.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.027
				Manganese	3.57	mg/kg	1.06E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-02	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.088
				Mercury (methyl)	0.12704	mg/kg	3.76E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.39E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.4
				Nickel	0.35	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-03	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.060
				Selenium	0.602	mg/kg	1.78E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.42
			Exp. Route Total								0.E+00					6
	Exposure Medium Total										0.E+00					6
Medium Total											0.E+00					6
								Total of Receptor Risks Across All Media			0.E+00	Total of Receptor Hazards Across All Media				6

TABLE 7.45.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Barium	0.11	mg/kg	3.17E-05	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	3.69E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0018
				Copper	0.36	mg/kg	1.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.24E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.031
				Manganese	0.482	mg/kg	1.43E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.012
				Mercury (methyl)	0.2384	mg/kg	7.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.23E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	8.2
				Nickel	0.198	mg/kg	5.86E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.84E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.034
				Selenium	0.258	mg/kg	7.63E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.91E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.18
				Strontium	0.618	mg/kg	1.83E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.13E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0036
				Zinc	8.36	mg/kg	2.47E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.89E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.096
				PCB-1254	0.141	mg/kg	4.17E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-05	4.87E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	24.
				PCB-1260	0.494	mg/kg	1.46E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-04	1.71E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0206	mg/kg	6.10E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	7.11E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0107	mg/kg	3.17E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	3.69E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.074
				alpha-Chlordane	0.0092	mg/kg	2.72E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	3.18E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.064
				gamma-Chlordane	0.0063	mg/kg	1.86E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-07	2.17E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.043
			Exp. Route Total								4.E-04					33
	Exposure Medium Total										4.E-04					33
Medium Total											4.E-04					33
									Total of Receptor Risks Across All Media		4.E-04	Total of Receptor Hazards Across All Media				33

TABLE 7.46.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reference Reach	Ingestion													
				Barium	0.118	mg/kg	3.49E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.07E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0020
				Chromium	0.145	mg/kg	4.29E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.01E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.17
				Copper	0.238	mg/kg	7.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.22E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.021
				Manganese	0.473	mg/kg	1.40E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.012
				Mercury (methyl)	0.09824	mg/kg	2.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.39E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	3.4
				Selenium	0.374	mg/kg	1.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.26
				Strontium	1.694	mg/kg	5.01E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.85E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0097
				Zinc	20	mg/kg	5.92E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.90E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.23
			Exp. Route Total								0.E+00					4
	Exposure Medium Total										0.E+00					4
Medium Total											0.E+00					4
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				4

TABLE 7.47.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Little Emory River	Ingestion													
				Barium	0.04	mg/kg	1.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.97E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00015
				Copper	0.33	mg/kg	1.05E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0061
				Manganese	0.13	mg/kg	4.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.39E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00067
				Mercury (methyl)	0.12	mg/kg	3.86E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.00E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.90
				Nickel	0.47	mg/kg	1.49E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.48E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.017
				Selenium	0.54	mg/kg	1.72E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.02E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.080
				Strontium	0.33	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00040
				Zinc	6.89	mg/kg	2.18E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.10E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.017
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1

TABLE 7.48.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Little Emory River	Ingestion													
				Aluminum	4.14	mg/kg	1.31E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.06E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0031
				Barium	0.0545	mg/kg	1.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.03E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00020
				Chromium	0.154	mg/kg	4.88E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.038
				Copper	0.297	mg/kg	9.42E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.20E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0055
				Manganese	1.08	mg/kg	3.42E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.99E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0057
				Mercury (methyl)	0.09312	mg/kg	2.95E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.89E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.69
				Selenium	0.646	mg/kg	2.05E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.78E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.096
				Strontium	0.794	mg/kg	2.52E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.87E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00098
				Zinc	16.1	mg/kg	5.10E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.19E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.040
			Exp. Route Total								0.E+00					0.9
	Exposure Medium Total										0.E+00					0.9
Medium Total											0.E+00					0.9
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.9

TABLE 7.49.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Little Emory River	Ingestion	Copper	0.72	mg/kg	2.29E-04	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	5.33E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.013
				Manganese	0.209	mg/kg	6.63E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.55E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0011
				Mercury (methyl)	0.16	mg/kg	5.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.2
				Selenium	0.326	mg/kg	1.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.41E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.048
				Strontium	0.0615	mg/kg	1.95E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.55E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000076
				Zinc	7.03	mg/kg	2.23E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.20E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.017
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1

TABLE 7.50.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Little Emory River	Ingestion													
				Barium	0.0915	mg/kg	2.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.77E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00034
				Chromium	0.238	mg/kg	7.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.059
				Copper	0.18	mg/kg	5.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0033
				Manganese	0.231	mg/kg	7.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.71E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0012
				Mercury (methyl)	0.12912	mg/kg	4.09E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.55E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.96
				Nickel	0.158	mg/kg	5.01E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.17E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0058
				Selenium	0.466	mg/kg	1.48E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.45E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.069
				Strontium	0.331	mg/kg	1.05E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00041
				Zinc	7.45	mg/kg	2.36E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.51E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.018
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1

TABLE 7.51.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Little Emory River	Ingestion													
				Barium	0.04	mg/kg	1.19E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00069
				Copper	0.33	mg/kg	9.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.029
				Manganese	0.13	mg/kg	3.76E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.38E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0031
				Mercury (methyl)	0.12	mg/kg	3.60E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.20E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.2
				Nickel	0.47	mg/kg	1.39E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-03	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.081
				Selenium	0.54	mg/kg	1.61E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.88E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.38
				Strontium	0.33	mg/kg	9.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0019
				Zinc	6.89	mg/kg	2.04E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.079
			Exp. Route Total								0.E+00					5
	Exposure Medium Total										0.E+00					5
Medium Total											0.E+00					5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			5

TABLE 7.52.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Little Emory River	Ingestion													
				Aluminum	4.14	mg/kg	1.22E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.014
				Barium	0.0545	mg/kg	1.61E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.88E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00094
				Chromium	0.154	mg/kg	4.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.32E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.18
				Copper	0.297	mg/kg	8.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.026
				Manganese	1.08	mg/kg	3.20E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.73E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.027
				Mercury (methyl)	0.09312	mg/kg	2.76E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.21E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	3.2
				Selenium	0.646	mg/kg	1.91E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.23E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.45
				Strontium	0.794	mg/kg	2.35E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.74E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0046
				Zinc	16.1	mg/kg	4.76E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.56E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.19
			Exp. Route Total								0.E+00					4
	Exposure Medium Total										0.E+00					4
Medium Total											0.E+00					4
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			4

TABLE 7.53.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Little Emory River	Ingestion	Copper	0.72	mg/kg	2.13E-04	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.49E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.062
				Manganese	0.209	mg/kg	6.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.21E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0052
				Mercury (methyl)	0.16	mg/kg	4.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.52E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	5.5
				Selenium	0.326	mg/kg	9.65E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.23
				Strontium	0.0615	mg/kg	1.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00035
				Zinc	7.03	mg/kg	2.08E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.081
			Exp. Route Total								0.E+00					6
	Exposure Medium Total										0.E+00					6
Medium Total											0.E+00					6
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			6

TABLE 7.54.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Little Emory River	Ingestion													
				Barium	0.0915	mg/kg	2.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.16E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0016
				Chromium	0.238	mg/kg	7.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.22E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.27
				Copper	0.18	mg/kg	5.33E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.21E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.016
				Manganese	0.231	mg/kg	6.84E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.97E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0057
				Mercury (methyl)	0.12912	mg/kg	3.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.46E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.5
				Nickel	0.158	mg/kg	4.68E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.45E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.027
				Selenium	0.466	mg/kg	1.38E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.32
				Strontium	0.331	mg/kg	9.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0019
				Zinc	7.45	mg/kg	2.20E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.086
			Exp. Route Total								0.E+00					5
	Exposure Medium Total										0.E+00					5
Medium Total											0.E+00					5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			5

TABLE 7.55.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Aluminum	0.155	mg/L	1.46E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.25E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0042
				Arsenic	0.00125	mg/L	1.17E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-05	3.42E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.11
				Barium	0.0415	mg/L	3.90E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0057
				Boron	0.0221	mg/L	2.08E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.05E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0030
				Chromium	0.00046	mg/L	4.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0042
				Cobalt	0.00033	mg/L	3.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.04E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.030
				Copper	0.00161	mg/L	1.51E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.41E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0011
				Iron	0.117	mg/L	1.10E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.21E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0046
				Manganese	0.0311	mg/L	2.92E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.52E-04	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.036
				Mercury	0.00023	mg/L	2.16E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.30E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.021
				Molybdenum	0.00089236	mg/L	8.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.44E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0049
				Nickel	0.00058332	mg/L	5.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00080
				Selenium	0.00076	mg/L	7.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0042
				Strontium	0.119	mg/L	1.12E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0054
				Vanadium	0.00162	mg/L	1.52E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.44E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0089
			Exp. Route Total								2.E-05					0.2
		Exposure Point Total									2.E-05					0.2
		Clinch River Reach A	Dermal	Aluminum	0.155	mg/L	7.60E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.22E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000022
				Arsenic	0.00125	mg/L	6.13E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	9.E-08	1.79E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00060
				Barium	0.0415	mg/L	2.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.94E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000030
				Boron	0.0221	mg/L	1.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.16E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000016
				Chromium	0.00046	mg/L	2.26E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.58E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000022
				Cobalt	0.00033	mg/L	1.62E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.72E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00016
				Copper	0.00161	mg/L	7.89E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.30E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000058
				Iron	0.117	mg/L	5.74E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.67E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000024
				Manganese	0.0311	mg/L	1.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.45E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00019
				Mercury	0.00023	mg/L	1.13E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.29E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00011
				Molybdenum	0.00089236	mg/L	4.38E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000026
				Nickel	0.00058332	mg/L	5.72E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.67E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000083
				Selenium	0.00076	mg/L	3.73E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000022
				Strontium	0.119	mg/L	5.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.70E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000028
				Vanadium	0.00162	mg/L	7.94E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.32E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000046
			Exp. Route Total								9.E-08					0.001
		Exposure Point Total									2.E-05					0.001
	Exposure Medium Total										2.E-05					0.2
Medium Total											2.E-05					0.2
									Total of Receptor Risks Across All Media		2.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.56.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Aluminum	0.155	mg/L	8.49E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.91E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0099
				Arsenic	0.00125	mg/L	6.85E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-05	7.99E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.27
				Barium	0.0415	mg/L	2.27E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.013
				Boron	0.0221	mg/L	1.21E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0071
				Chromium	0.00046	mg/L	2.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.94E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0098
				Cobalt	0.00033	mg/L	1.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.11E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.070
				Copper	0.00161	mg/L	8.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0026
				Iron	0.117	mg/L	6.41E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.48E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.011
				Manganese	0.0311	mg/L	1.70E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.99E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.083
				Mercury	0.00023	mg/L	1.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.049
				Molybdenum	0.00089236	mg/L	4.89E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.70E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Nickel	0.00058332	mg/L	3.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.73E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0019
				Selenium	0.00076	mg/L	4.16E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.86E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0097
				Strontium	0.119	mg/L	6.52E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.61E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.013
				Vanadium	0.00162	mg/L	8.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.021
			Exp. Route Total								1.E-05					0.6
		Exposure Point Total									1.E-05					0.6
		Clinch River Reach A	Dermal	Aluminum	0.155	mg/L	5.61E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.54E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000065
				Arsenic	0.00125	mg/L	4.52E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-08	5.27E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0018
				Barium	0.0415	mg/L	1.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000088
				Boron	0.0221	mg/L	7.99E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.32E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000047
				Chromium	0.00046	mg/L	1.66E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000065
				Cobalt	0.00033	mg/L	1.19E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00046
				Copper	0.00161	mg/L	5.82E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.79E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000017
				Iron	0.117	mg/L	4.23E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.94E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000071
				Manganese	0.0311	mg/L	1.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.31E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00055
				Mercury	0.00023	mg/L	8.32E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.70E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00032
				Molybdenum	0.00089236	mg/L	3.23E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.77E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000075
				Nickel	0.00058332	mg/L	4.22E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.92E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000025
				Selenium	0.00076	mg/L	2.75E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.21E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000064
				Strontium	0.119	mg/L	4.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.02E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000084
				Vanadium	0.00162	mg/L	5.86E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.84E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00014
			Exp. Route Total								7.E-08					0.004
		Exposure Point Total									7.E-08					0.004
	Exposure Medium Total										1.E-05					0.6
Medium Total											1.E-05					0.6
							Total of Receptor Risks Across All Media				1.E-05	Total of Receptor Hazards Across All Media				0.6

TABLE 7.57.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach A	Ingestion	Aluminum	70028	mg/kg	4.51E-03	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.32E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.013
				Antimony	2.52	mg/kg	1.62E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.73E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.0012
				Arsenic	28.62	mg/kg	1.84E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-06	5.38E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.018
				Barium	133.4	mg/kg	8.59E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.51E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00013
				Beryllium	2.525	mg/kg	1.63E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.74E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00024
				Boron	50.23	mg/kg	3.24E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.44E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000047
				Chromium	69.36	mg/kg	4.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.30E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0043
				Cobalt	13.27	mg/kg	8.55E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.49E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0083
				Copper	36.85	mg/kg	2.37E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.92E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00017
				Chromium VI	0.83	mg/kg	5.35E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.56E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000052
				Manganese	1016	mg/kg	6.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.91E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0014
				Mercury	0.204	mg/kg	1.31E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.83E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00013
				Nickel	45.88	mg/kg	2.96E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.62E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00043
				Strontium	27.56	mg/kg	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000086
				Vanadium	89.27	mg/kg	5.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.68E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0034
				Zinc	307.8	mg/kg	1.98E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.78E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00019
				Iron	51886	mg/kg	3.34E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.75E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.014
				Acenaphthylene	0.00079	mg/kg	5.09E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.48E-10	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.0
				Anthracene	0.0011	mg/kg	7.09E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.07E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.0083	mg/kg	5.35E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-10	1.56E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0091	mg/kg	5.86E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	4.E-09	1.71E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.011	mg/kg	7.09E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	5.E-10	2.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.0097	mg/kg	6.25E-10	mg/kg-day	7.3E-02	(mg/kg-day)-1	5.E-11	1.82E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.0093	mg/kg	5.99E-10	mg/kg-day	7.3E-03	(mg/kg-day)-1	4.E-12	1.75E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	1.42E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-09	4.13E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.018	mg/kg	1.16E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.38E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000085
				Fluorene	0.00081	mg/kg	5.22E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0
				Indeno(1,2,3-cd)pyrene	0.0061	mg/kg	3.93E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	1.15E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0024	mg/kg	1.55E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.51E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000023
				Phenanthrene	0.0081	mg/kg	5.22E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000051
				Pyrene	0.013	mg/kg	8.37E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.44E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000081
				PCB-1254	0.0082	mg/kg	5.28E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	1.54E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.000077
				PCB-1260	0.0061	mg/kg	3.93E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-10	1.15E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00083	mg/kg	5.35E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	1.E-10	1.56E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000019
				Heptachlor	0.00035	mg/kg	2.25E-11	mg/kg-day	4.5E+00	(mg/kg-day)-1	1.E-10	6.58E-11	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00000013
			Exp. Route Total								3.E-06					0.07
			Dermal	Aluminum	70028	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	2.52	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	28.62	mg/kg	2.52E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	4.E-06	7.36E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.026
				Barium	133.4	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	2.525	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	50.23	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	69.36	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	13.27	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	36.85	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.83	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Manganese	1016	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.204	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	45.88	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Strontium	27.56	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	89.27	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	307.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	51886	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Acenaphthylene	0.00079	mg/kg	3.02E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.80E-10	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.000000015

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Anthracene	0.0011	mg/kg	4.20E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.0083	mg/kg	3.17E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	9.24E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0091	mg/kg	3.47E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-08	1.01E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.011	mg/kg	4.20E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	1.23E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.0097	mg/kg	3.70E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	3.E-10	1.08E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.0093	mg/kg	3.55E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	3.E-11	1.04E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	8.40E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	6.E-09	2.45E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.018	mg/kg	6.87E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000050
				Fluorene	0.00081	mg/kg	3.09E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.02E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000023
				Indeno(1,2,3-cd)pyrene	0.0061	mg/kg	2.33E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	6.79E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0024	mg/kg	7.05E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.06E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000010
				Phenanthrene	0.0081	mg/kg	2.38E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.94E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000023
				Pyrene	0.013	mg/kg	3.82E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000037
				PCB-1254	0.0082	mg/kg	3.37E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-09	9.83E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00049
				PCB-1260	0.0061	mg/kg	2.51E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-09	7.32E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00083	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				Heptachlor	0.00035	mg/kg	ND	mg/kg-day	4.5E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	5.0E-04	1/(mg/kg-day)	NA
			Exp. Route Total								4.E-06					0.03
		Exposure Point Total									7.E-06					0.09
	Exposure Medium Total										7.E-06					0.09
Medium Total											7.E-06					0.09
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Aluminum	0.155	mg/L	6.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.91E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000019
				Arsenic	0.00125	mg/L	5.28E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	8.E-08	1.54E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00051
				Barium	0.0415	mg/L	1.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.12E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000026
				Boron	0.0221	mg/L	9.34E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.72E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000014
				Chromium	0.00046	mg/L	1.94E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.67E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000019
				Cobalt	0.00033	mg/L	1.39E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.07E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00014
				Copper	0.00161	mg/L	6.81E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.98E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000050
				Iron	0.117	mg/L	4.95E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000021
				Manganese	0.0311	mg/L	1.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.83E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00016
				Mercury	0.00023	mg/L	9.72E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000095
				Molybdenum	0.00089236	mg/L	3.77E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.10E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000022
				Nickel	0.00058332	mg/L	2.47E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.19E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000036
				Selenium	0.00076	mg/L	3.21E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.37E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000019
				Strontium	0.119	mg/L	5.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000024
				Vanadium	0.00162	mg/L	6.85E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000040
			Exp. Route Total								8.E-08					0.001
		Exposure Point Total									8.E-08					0.001
		Clinch River Reach A	Dermal	Aluminum	0.155	mg/L	2.36E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	6.88E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000069
				Arsenic	0.00125	mg/L	1.90E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	3.E-08	5.55E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00019
				Barium	0.0415	mg/L	6.32E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.84E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00013
				Boron	0.0221	mg/L	3.36E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.81E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000049
				Chromium	0.00046	mg/L	7.00E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.04E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00052
				Cobalt	0.00033	mg/L	5.02E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.93E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000098
				Copper	0.00161	mg/L	2.45E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000018
				Iron	0.117	mg/L	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.19E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000074
				Manganese	0.0311	mg/L	4.73E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0014
				Mercury	0.00023	mg/L	3.50E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-08	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000043
				Molybdenum	0.00089236	mg/L	1.36E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.96E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000079
				Nickel	0.00058332	mg/L	1.78E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000065
				Selenium	0.00076	mg/L	1.16E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.37E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000084
				Strontium	0.119	mg/L	1.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000088
				Vanadium	0.00162	mg/L	2.47E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.19E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00055
			Exp. Route Total								3.E-08					0.003
	Exposure Medium Total										1.E-07					0.004
Medium Total											1.E-07					0.004
									Total of Receptor Risks Across All Media		7.E-06		Total of Receptor Hazards Across All Media			0.1

TABLE 7.58.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach A	Ingestion	Aluminum	70028	mg/kg	2.92E-03	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	2.46E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.025
				Antimony	2.52	mg/kg	1.05E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.84E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.0022
				Arsenic	28.62	mg/kg	1.19E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-06	1.00E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.033
				Barium	133.4	mg/kg	5.57E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.68E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00023
				Beryllium	2.525	mg/kg	1.05E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.85E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00044
				Boron	50.23	mg/kg	2.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000088
				Chromium	69.36	mg/kg	2.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0081
				Cobalt	13.27	mg/kg	5.54E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.65E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.016
				Copper	36.85	mg/kg	1.54E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00032
				Chromium VI	0.83	mg/kg	3.47E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.91E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000097
				Manganese	1016	mg/kg	4.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.56E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0025
				Mercury	0.204	mg/kg	8.52E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00024
				Nickel	45.88	mg/kg	1.92E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00080
				Strontium	27.56	mg/kg	1.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.66E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000016
				Vanadium	89.27	mg/kg	3.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.13E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0063
				Zinc	307.8	mg/kg	1.29E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00036
				Iron	51886	mg/kg	2.17E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.82E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.026
				Acenaphthylene	0.00079	mg/kg	3.30E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.77E-10	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.0
				Anthracene	0.0011	mg/kg	4.59E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.86E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.0083	mg/kg	3.47E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	2.91E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0091	mg/kg	3.80E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-09	3.19E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.011	mg/kg	4.59E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	3.86E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.0097	mg/kg	4.05E-10	mg/kg-day	7.3E-02	(mg/kg-day)-1	3.E-11	3.40E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.0093	mg/kg	3.88E-10	mg/kg-day	7.3E-03	(mg/kg-day)-1	3.E-12	3.26E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	9.18E-11	mg/kg-day	7.3E+00	(mg/kg-day)-1	7.E-10	7.72E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.018	mg/kg	7.51E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.31E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000016
				Fluorene	0.00081	mg/kg	3.38E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0
				Indeno(1,2,3-cd)pyrene	0.0061	mg/kg	2.55E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-10	2.14E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0024	mg/kg	1.00E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.42E-10	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000042
				Phenanthrene	0.0081	mg/kg	3.38E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000095
				Pyrene	0.013	mg/kg	5.43E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.56E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000015
				PCB-1254	0.0082	mg/kg	3.42E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-10	2.88E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00014
				PCB-1260	0.0061	mg/kg	2.55E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-10	2.14E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00083	mg/kg	3.47E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	6.E-11	2.91E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000036
				Heptachlor	0.00035	mg/kg	1.46E-11	mg/kg-day	4.5E+00	(mg/kg-day)-1	7.E-11	1.23E-10	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00000025
			Exp. Route Total								2.E-06					0.1
			Dermal	Aluminum	70028	mg/kg	ND	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	2.52	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	28.62	mg/kg	1.01E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-06	7.07E-06	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.025
				Barium	133.4	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	2.525	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	50.23	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	69.36	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	13.27	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	36.85	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.83	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Manganese	1016	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.204	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	45.88	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Strontium	27.56	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Vanadium	89.27	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	307.8	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	51886	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Acenaphthylene	0.00079	mg/kg	1.21E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.46E-10	mg/kg-day	6.0E-02	1/(mg/kg-day)	0.000000014

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Anthracene	0.0011	mg/kg	1.68E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0
				Benzo(a)anthracene	0.0083	mg/kg	1.27E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	9.E-10	8.88E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.0091	mg/kg	1.39E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-08	9.74E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.011	mg/kg	1.68E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	1.18E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.0097	mg/kg	1.48E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	1.E-10	1.04E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.0093	mg/kg	1.42E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	1.E-11	9.96E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0022	mg/kg	3.36E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-09	2.35E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.018	mg/kg	2.75E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.93E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000048
				Fluorene	0.00081	mg/kg	1.24E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.67E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000022
				Indeno(1,2,3-cd)pyrene	0.0061	mg/kg	9.33E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	7.E-10	6.53E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0024	mg/kg	2.82E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.98E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000099
				Phenanthrene	0.0081	mg/kg	9.53E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.67E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000022
				Pyrene	0.013	mg/kg	1.53E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000036
				PCB-1254	0.0082	mg/kg	1.35E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-09	9.45E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00047
				PCB-1260	0.0061	mg/kg	1.00E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-09	7.03E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				beta-BHC	0.00083	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				Heptachlor	0.00035	mg/kg	ND	mg/kg-day	4.5E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	5.0E-04	1/(mg/kg-day)	NA
			Exp. Route Total								2.E-06					0.03
		Exposure Point Total									2.E-06					0.03
	Exposure Medium Total										3.E-06					0.1
Medium Total											3.E-06					0.1
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Aluminum	0.155	mg/L	4.25E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.97E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000030
				Arsenic	0.00125	mg/L	3.42E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-08	2.40E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00080
				Barium	0.0415	mg/L	1.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.96E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000040
				Boron	0.0221	mg/L	6.05E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.24E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000021
				Chromium	0.00046	mg/L	1.26E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.82E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000029
				Cobalt	0.00033	mg/L	9.04E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.33E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00021
				Copper	0.00161	mg/L	4.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000077
				Iron	0.117	mg/L	3.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000032
				Manganese	0.0311	mg/L	8.52E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.96E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00025
				Mercury	0.00023	mg/L	6.30E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.41E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00015
				Molybdenum	0.00089236	mg/L	2.44E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.71E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000034
				Nickel	0.00058332	mg/L	1.60E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000056
				Selenium	0.00076	mg/L	2.08E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000029
				Strontium	0.119	mg/L	3.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.28E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000038
				Vanadium	0.00162	mg/L	4.44E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.11E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000062
			Exp. Route Total								5.E-08					0.002
		Exposure Point Total									5.E-08					0.002
		Clinch River Reach A	Dermal	Aluminum	0.155	mg/L	1.25E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	8.72E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000087
				Arsenic	0.00125	mg/L	1.01E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-08	7.04E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00025
				Barium	0.0415	mg/L	3.34E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00017
				Boron	0.0221	mg/L	1.78E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.24E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000062
				Chromium	0.00046	mg/L	3.70E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00066
				Cobalt	0.00033	mg/L	2.65E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.000062
				Copper	0.00161	mg/L	1.29E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.06E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000023
				Iron	0.117	mg/L	9.41E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.59E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000094
				Manganese	0.0311	mg/L	2.50E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0018
				Mercury	0.00023	mg/L	1.85E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-08	mg/kg-day	2.4E-04	1/(mg/kg-day)	0.000054
				Molybdenum	0.00089236	mg/L	7.18E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.02E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000010
				Nickel	0.00058332	mg/L	9.38E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.57E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000082
				Selenium	0.00076	mg/L	6.11E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.28E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.000011
				Strontium	0.119	mg/L	9.57E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.70E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000011
				Vanadium	0.00162	mg/L	1.30E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.12E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00070
			Exp. Route Total								2.E-08					0.004
	Exposure Medium Total										7.E-08					0.006
Medium Total											7.E-08					0.006
									Total of Receptor Risks Across All Media		3.E-06		Total of Receptor Hazards Across All Media			0.2

TABLE 7.59.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion													
				Copper	0.443	mg/kg	1.40E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.28E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0082
				Manganese	0.224	mg/kg	7.10E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0012
				Mercury (methyl)	0.2944	mg/kg	9.33E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.18E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	2.2
				Nickel	0.134	mg/kg	4.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.91E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0050
				Selenium	0.718	mg/kg	2.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.31E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.11
				Strontium	0.334	mg/kg	1.06E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.47E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00041
				Zinc	13.2	mg/kg	4.18E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.76E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.033
				PCB-1254	0.0833	mg/kg	2.64E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-05	6.16E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	3.1
				PCB-1260	0.234	mg/kg	7.42E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.73E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.018	mg/kg	5.71E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.33E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.005	mg/kg	1.59E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	5.E-07	3.70E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0074
			Exp. Route Total								2.E-04					5
	Exposure Medium Total										2.E-04					5
Medium Total											2.E-04					5
									Total of Receptor Risks Across All Media		2.E-04		Total of Receptor Hazards Across All Media			5

TABLE 7.60.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reach A	Ingestion													
				Barium	0.086	mg/kg	2.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.36E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00032
				Cobalt	0.0154	mg/kg	4.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.038
				Copper	0.281	mg/kg	8.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0052
				Manganese	0.503	mg/kg	1.59E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.72E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0027
				Mercury (methyl)	0.10464	mg/kg	3.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.74E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.77
				Selenium	1.17	mg/kg	3.71E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.65E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.17
				Silver	0.00455	mg/kg	1.44E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.37E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00067
				Strontium	0.624	mg/kg	1.98E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.62E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00077
				Zinc	16.9	mg/kg	5.36E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.042
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1

TABLE 7.61.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Arsenic	0.002	mg/kg	6.34E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.E-06	1.48E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0049
				Barium	0.0645	mg/kg	2.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.77E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00024
				Chromium	0.199	mg/kg	6.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.049
				Copper	3.68	mg/kg	1.17E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.72E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.068
				Manganese	0.405	mg/kg	1.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.00E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0021
				Mercury (methyl)	0.15008	mg/kg	4.76E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.1
				Nickel	0.245	mg/kg	7.77E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.81E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0091
				Selenium	0.493	mg/kg	1.56E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.65E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.073
				Strontium	0.413	mg/kg	1.31E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.06E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00051
				Zinc	7.39	mg/kg	2.34E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.47E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.018
				PCB-1254	0.109	mg/kg	3.46E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-05	8.06E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	4.0
				PCB-1260	0.227	mg/kg	7.20E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.68E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0144	mg/kg	4.57E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.07E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0064	mg/kg	2.03E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	7.E-07	4.73E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0095
				alpha-Chlordane	0.0089	mg/kg	2.82E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	6.58E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.013
				gamma-Chlordane	0.0031	mg/kg	9.83E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	3.E-07	2.29E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0046
			Exp. Route Total								2.E-04					5
	Exposure Medium Total										2.E-04					5
Medium Total											2.E-04					5
									Total of Receptor Risks Across All Media		2.E-04			Total of Receptor Hazards Across All Media		5

TABLE 7.62.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reach A	Ingestion													
				Chromium	0.12	mg/kg	3.80E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.88E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.030
				Copper	0.364	mg/kg	1.15E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.69E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0067
				Manganese	0.207	mg/kg	6.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.53E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0011
				Mercury (methyl)	0.07664	mg/kg	2.43E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.67E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.57
				Nickel	0.113	mg/kg	3.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.36E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0042
				Selenium	0.298	mg/kg	9.45E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.20E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.044
				Strontium	0.126	mg/kg	3.99E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.32E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00016
				Zinc	8.04	mg/kg	2.55E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.95E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.020
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00			Total of Receptor Hazards Across All Media		1

TABLE 7.63.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Clinch River Reach A	Ingestion													
				Copper	0.443	mg/kg	1.31E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.53E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.038
				Manganese	0.224	mg/kg	6.63E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.73E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0055
				Mercury (methyl)	0.2944	mg/kg	8.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-03	mg/kg-day	1.0E-04	1/(mg/kg-day)	10.
				Nickel	0.134	mg/kg	3.96E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.63E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.023
				Selenium	0.718	mg/kg	2.12E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.48E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.50
				Strontium	0.334	mg/kg	9.88E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.15E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0019
				Zinc	13.2	mg/kg	3.91E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.56E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.15
				PCB-1254	0.0833	mg/kg	2.46E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-05	2.88E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	14.
				PCB-1260	0.234	mg/kg	6.92E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	8.08E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.018	mg/kg	5.33E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	6.21E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.005	mg/kg	1.48E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	5.E-07	1.73E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.035
			Exp. Route Total								2.E-04					25
	Exposure Medium Total										2.E-04					25
Medium Total											2.E-04					25
									Total of Receptor Risks Across All Media		2.E-04		Total of Receptor Hazards Across All Media			25

TABLE 7.64.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Clinch River Reach A	Ingestion													
				Barium	0.086	mg/kg	2.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.97E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0015
				Cobalt	0.0154	mg/kg	4.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.32E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.18
				Copper	0.281	mg/kg	8.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.70E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.024
				Manganese	0.503	mg/kg	1.49E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.74E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.012
				Mercury (methyl)	0.10464	mg/kg	3.10E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.61E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	3.6
				Selenium	1.17	mg/kg	3.46E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.04E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.81
				Silver	0.00455	mg/kg	1.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.57E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0031
				Strontium	0.624	mg/kg	1.85E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.15E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0036
				Zinc	16.9	mg/kg	5.00E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.83E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.19
			Exp. Route Total								0.E+00					5
	Exposure Medium Total										0.E+00					5
Medium Total											0.E+00					5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			5

TABLE 7.65.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Arsenic	0.002	mg/kg	5.92E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	9.E-07	6.90E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.023
				Barium	0.0645	mg/kg	1.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.23E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0011
				Chromium	0.199	mg/kg	5.89E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.87E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.23
				Copper	3.68	mg/kg	1.09E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.27E-02	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.32
				Manganese	0.405	mg/kg	1.20E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0100
				Mercury (methyl)	0.15008	mg/kg	4.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	5.2
				Nickel	0.245	mg/kg	7.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.46E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.042
				Selenium	0.493	mg/kg	1.46E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.70E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.34
				Strontium	0.413	mg/kg	1.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0024
				Zinc	7.39	mg/kg	2.19E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.55E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.085
				PCB-1254	0.109	mg/kg	3.23E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-05	3.76E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	19.
				PCB-1260	0.227	mg/kg	6.72E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	7.84E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0144	mg/kg	4.26E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	4.97E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0064	mg/kg	1.89E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	6.E-07	2.21E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.044
				alpha-Chlordane	0.0089	mg/kg	2.63E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	9.E-07	3.07E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.061
				gamma-Chlordane	0.0031	mg/kg	9.17E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	3.E-07	1.07E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.021
			Exp. Route Total								2.E-04					25
	Exposure Medium Total										2.E-04					25
Medium Total											2.E-04					25
									Total of Receptor Risks Across All Media		2.E-04		Total of Receptor Hazards Across All Media			25

TABLE 7.66.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reach A	Ingestion													
				Chromium	0.12	mg/kg	3.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.14E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.14
				Copper	0.364	mg/kg	1.08E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.031
				Manganese	0.207	mg/kg	6.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0051
				Mercury (methyl)	0.07664	mg/kg	2.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	2.6
				Nickel	0.113	mg/kg	3.34E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.90E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.020
				Selenium	0.298	mg/kg	8.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.21
				Strontium	0.126	mg/kg	3.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.35E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00072
				Zinc	8.04	mg/kg	2.38E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.78E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.093
			Exp. Route Total								0.E+00					3
	Exposure Medium Total										0.E+00					3
Medium Total											0.E+00					3
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			3

TABLE 7.67.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Aluminum	0.125	mg/L	1.17E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.42E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0034
				Arsenic	0.00125	mg/L	1.17E-05	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-05	3.42E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.11
				Barium	0.0395	mg/L	3.71E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0054
				Boron	0.0196	mg/L	1.84E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.37E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0027
				Chromium	0.00039	mg/L	3.66E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0036
				Copper	0.00182	mg/L	1.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.99E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0012
				Iron	0.119	mg/L	1.12E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0047
				Manganese	0.0342	mg/L	3.21E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.37E-04	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.039
				Molybdenum	0.0009272	mg/L	8.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.54E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0051
				Nickel	0.00054319	mg/L	5.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.49E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00074
				Selenium	0.00038	mg/L	3.57E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0021
				Strontium	0.115	mg/L	1.08E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.15E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0053
				Vanadium	0.00161	mg/L	1.51E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.41E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0088
			Exp. Route Total								2.E-05					0.2
		Exposure Point Total									2.E-05					0.2
		Clinch River Reach B	Dermal	Aluminum	0.125	mg/L	6.13E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.79E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000018
				Arsenic	0.00125	mg/L	6.13E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	9.E-08	1.79E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00060
				Barium	0.0395	mg/L	1.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.65E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000028
				Boron	0.0196	mg/L	9.61E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.80E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000014
				Chromium	0.00039	mg/L	1.91E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.58E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000019
				Copper	0.00182	mg/L	8.92E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.60E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000065
				Iron	0.119	mg/L	5.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.70E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000024
				Manganese	0.0342	mg/L	1.68E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.89E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00020
				Molybdenum	0.0009272	mg/L	4.55E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000027
				Nickel	0.00054319	mg/L	5.33E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.55E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000078
				Selenium	0.00038	mg/L	1.86E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.43E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000011
				Strontium	0.115	mg/L	5.64E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.64E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000027
				Vanadium	0.00161	mg/L	7.89E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.30E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000046
			Exp. Route Total								9.E-08					0.001
		Exposure Point Total									2.E-05					0.001
	Exposure Medium Total										2.E-05					0.2
Medium Total											2.E-05					0.2
									Total of Receptor Risks Across All Media		2.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.68.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Aluminum	0.125	mg/L	6.85E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.99E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0080
				Arsenic	0.00125	mg/L	6.85E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-05	7.99E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.27
				Barium	0.0395	mg/L	2.16E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.013
				Boron	0.0196	mg/L	1.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0063
				Chromium	0.00039	mg/L	2.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.49E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0083
				Copper	0.00182	mg/L	9.97E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.16E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0029
				Iron	0.119	mg/L	6.52E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.61E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.011
				Manganese	0.0342	mg/L	1.87E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.19E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.091
				Molybdenum	0.0009272	mg/L	5.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.93E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.012
				Nickel	0.00054319	mg/L	2.98E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.47E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0017
				Selenium	0.00038	mg/L	2.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0049
				Strontium	0.115	mg/L	6.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.35E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.012
				Vanadium	0.00161	mg/L	8.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.021
			Exp. Route Total								1.E-05					0.5
		Exposure Point Total									1.E-05					0.5
		Clinch River Reach B	Dermal	Aluminum	0.125	mg/L	4.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.27E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000053
				Arsenic	0.00125	mg/L	4.52E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-08	5.27E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0018
				Barium	0.0395	mg/L	1.43E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.67E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000083
				Boron	0.0196	mg/L	7.09E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.27E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000041
				Chromium	0.00039	mg/L	1.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.65E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000055
				Copper	0.00182	mg/L	6.58E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.68E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000019
				Iron	0.119	mg/L	4.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.02E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000072
				Manganese	0.0342	mg/L	1.24E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00060
				Molybdenum	0.0009272	mg/L	3.35E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.91E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000078
				Nickel	0.00054319	mg/L	3.93E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.58E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000023
				Selenium	0.00038	mg/L	1.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000032
				Strontium	0.115	mg/L	4.16E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.85E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000081
				Vanadium	0.00161	mg/L	5.82E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.79E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00014
			Exp. Route Total								7.E-08					0.003
		Exposure Point Total									1.E-05					0.003
	Exposure Medium Total										1.E-05					0.5
Medium Total											1.E-05					0.5
							Total of Receptor Risks Across All Media				1.E-05	Total of Receptor Hazards Across All Media				0.5

TABLE 7.69.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach B	Ingestion	Aluminum	34331	mg/kg	2.21E-03	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	6.45E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0064
				Antimony	1.73	mg/kg	1.11E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.25E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.00081
				Arsenic	42.61	mg/kg	2.74E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	4.E-06	8.01E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.027
				Barium	138.9	mg/kg	8.95E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.61E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00013
				Beryllium	1.029	mg/kg	6.63E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.93E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.000097
				Boron	35.3	mg/kg	2.27E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.63E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000033
				Chromium	47.97	mg/kg	3.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.01E-06	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0030
				Cobalt	17.89	mg/kg	1.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.36E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.011
				Copper	22.84	mg/kg	1.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.29E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00011
				Chromium VI	0.84	mg/kg	5.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.58E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000053
				Lead	39.23	mg/kg	2.53E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.37E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1655	mg/kg	1.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.11E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0022
				Mercury	0.679	mg/kg	4.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00043
				Nickel	20.06	mg/kg	1.29E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.77E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00019
				Selenium	1.77	mg/kg	1.14E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.33E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000067
				Strontium	23.22	mg/kg	1.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.36E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000073
				Thallium	3.11	mg/kg	2.00E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.84E-07	mg/kg-day	1.0E-05	1/(mg/kg-day)	0.058
				Vanadium	48.85	mg/kg	3.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.18E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0018
				Zinc	87.05	mg/kg	5.61E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.64E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.000055
				Iron	34139	mg/kg	2.20E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.41E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0092
				Anthracene	0.0019	mg/kg	1.22E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00
				Benzo(a)anthracene	0.015	mg/kg	9.66E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	7.E-10	2.82E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.014	mg/kg	9.02E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	7.E-09	2.63E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.023	mg/kg	1.48E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	4.32E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.016	mg/kg	1.03E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	8.E-11	3.01E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.018	mg/kg	1.16E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	8.E-12	3.38E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	2.00E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	1.E-09	5.82E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.026	mg/kg	1.67E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.88E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000012
				Fluorene	0.0019	mg/kg	1.22E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00
				Indeno(1,2,3-cd)pyrene	0.0086	mg/kg	5.54E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-10	1.62E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0061	mg/kg	3.93E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.15E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000000057
				Phenanthrene	0.013	mg/kg	8.37E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.44E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.000000081
				Pyrene	0.03	mg/kg	1.93E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.64E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000019
				PCB-1254	0.014	mg/kg	9.02E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-09	2.63E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00013
				PCB-1260	0.011	mg/kg	7.09E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	2.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDD	0.0012	mg/kg	7.73E-11	mg/kg-day	2.4E-01	(mg/kg-day)-1	2.E-11	2.25E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-BHC	0.00047	mg/kg	3.03E-11	mg/kg-day	6.3E+00	(mg/kg-day)-1	2.E-10	8.83E-11	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000011
				beta-BHC	0.00067	mg/kg	4.32E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	8.E-11	1.26E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000016
			Exp. Route Total								4.E-06					0.12
			Dermal	Aluminum	34331	mg/kg	ND	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	1.73	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	42.61	mg/kg	3.75E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	6.E-06	1.10E-05	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.038
				Barium	138.9	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.029	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	35.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	47.97	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	17.89	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	22.84	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.84	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Lead	39.23	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1655	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.679	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	20.06	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Selenium	1.77	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-03	1/(mg/kg-day)	NA
				Strontium	23.22	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Thallium	3.11	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.0E-05	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Vanadium	48.85	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	87.05	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	34139	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Anthracene	0.0019	mg/kg	7.25E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00
				Benzo(a)anthracene	0.015	mg/kg	5.73E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	4.E-09	1.67E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.014	mg/kg	5.35E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	4.E-08	1.56E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.023	mg/kg	8.78E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	6.E-09	2.56E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.016	mg/kg	6.11E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	4.E-10	1.78E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.018	mg/kg	6.87E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	5.E-11	2.00E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	1.18E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	9.E-09	3.45E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.026	mg/kg	9.93E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.90E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000072
				Fluorene	0.0019	mg/kg	7.25E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000053
				Indeno(1,2,3-cd)pyrene	0.0086	mg/kg	3.28E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	9.58E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0061	mg/kg	1.79E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.23E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000026
				Phenanthrene	0.013	mg/kg	3.82E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000037
				Pyrene	0.03	mg/kg	8.81E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000086
				PCB-1254	0.014	mg/kg	5.76E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-08	1.68E-08	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00084
				PCB-1260	0.011	mg/kg	4.52E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-09	1.32E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDD	0.0012	mg/kg	ND	mg/kg-day	2.4E-01	(mg/kg-day)-1	NA	ND	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-BHC	0.00047	mg/kg	ND	mg/kg-day	6.3E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				beta-BHC	0.00067	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
			Exp. Route Total								6.E-06					0.04
		Exposure Point Total									1.E-05					0.2
	Exposure Medium Total										1.E-05					0.2
Medium Total											1.E-05					0.2
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Aluminum	0.125	mg/L	5.28E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	1.54E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000015
				Arsenic	0.00125	mg/L	5.28E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	8.E-08	1.54E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00051
				Barium	0.0395	mg/L	1.67E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.87E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000024
				Boron	0.0196	mg/L	8.28E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000012
				Chromium	0.00039	mg/L	1.65E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.81E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000016
				Copper	0.00182	mg/L	7.69E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000056
				Iron	0.119	mg/L	5.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000021
				Manganese	0.0342	mg/L	1.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.22E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00018
				Molybdenum	0.0009272	mg/L	3.92E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000023
				Nickel	0.00054319	mg/L	2.30E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.70E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000033
				Selenium	0.00038	mg/L	1.61E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.68E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000094
				Strontium	0.115	mg/L	4.86E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.42E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000024
				Vanadium	0.00161	mg/L	6.81E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.98E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000040
			Exp. Route Total								8.E-08					0.0009
		Exposure Point Total									8.E-08					0.0009
		Clinch River Reach B	Dermal	Aluminum	0.125	mg/L	1.90E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	5.55E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000055
				Arsenic	0.00125	mg/L	1.90E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	3.E-08	5.55E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00019
				Barium	0.0395	mg/L	6.01E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00013
				Boron	0.0196	mg/L	2.98E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.70E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000043
				Chromium	0.00039	mg/L	5.93E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.73E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00044
				Copper	0.00182	mg/L	2.77E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.08E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000020
				Iron	0.119	mg/L	1.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000075
				Manganese	0.0342	mg/L	5.20E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0016
				Molybdenum	0.0009272	mg/L	1.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.12E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000082
				Nickel	0.00054319	mg/L	1.65E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.82E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000060
				Selenium	0.00038	mg/L	5.78E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.69E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000042
				Strontium	0.115	mg/L	1.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.10E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000085
				Vanadium	0.00161	mg/L	2.45E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00055
			Exp. Route Total								3.E-08					0.003
	Exposure Medium Total										1.E-07					0.004
Medium Total											1.E-07					0.004
							Total of Receptor Risks Across All Media				1.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.70.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach B	Ingestion	Aluminum	34331	mg/kg	1.43E-03	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	1.20E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.012
				Antimony	1.73	mg/kg	7.22E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.07E-07	mg/kg-day	4.0E-04	1/(mg/kg-day)	0.0015
				Arsenic	42.61	mg/kg	1.78E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-06	1.49E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.050
				Barium	138.9	mg/kg	5.80E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.87E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00024
				Beryllium	1.029	mg/kg	4.30E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.61E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00018
				Boron	35.3	mg/kg	1.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.24E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000062
				Chromium	47.97	mg/kg	2.00E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.68E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0056
				Cobalt	17.89	mg/kg	7.47E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.27E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.021
				Copper	22.84	mg/kg	9.54E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.01E-06	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00020
				Chromium VI	0.84	mg/kg	3.51E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.95E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000098
				Lead	39.23	mg/kg	1.64E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1655	mg/kg	6.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.80E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0041
				Mercury	0.679	mg/kg	2.83E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.38E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00079
				Nickel	20.06	mg/kg	8.37E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.03E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00035
				Selenium	1.77	mg/kg	7.39E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.21E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00012
				Strontium	23.22	mg/kg	9.69E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.14E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000014
				Thallium	3.11	mg/kg	1.30E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-06	mg/kg-day	1.0E-05	1/(mg/kg-day)	0.11
				Vanadium	48.85	mg/kg	2.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.71E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0034
				Zinc	87.05	mg/kg	3.63E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.05E-05	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00010
				Iron	34139	mg/kg	1.43E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.017
				Anthracene	0.0019	mg/kg	7.93E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.66E-10	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00
				Benzo(a)anthracene	0.015	mg/kg	6.26E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	5.E-10	5.26E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.014	mg/kg	5.84E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	4.E-09	4.91E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.023	mg/kg	9.60E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	7.E-10	8.07E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.016	mg/kg	6.68E-10	mg/kg-day	7.3E-02	(mg/kg-day)-1	5.E-11	5.61E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.018	mg/kg	7.51E-10	mg/kg-day	7.3E-03	(mg/kg-day)-1	5.E-12	6.31E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	1.29E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	9.E-10	1.09E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.026	mg/kg	1.09E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.12E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000023
				Fluorene	0.0019	mg/kg	7.93E-11	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.66E-10	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000017
				Indeno(1,2,3-cd)pyrene	0.0086	mg/kg	3.59E-10	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-10	3.02E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0061	mg/kg	2.55E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000011
				Phenanthrene	0.013	mg/kg	5.43E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.56E-09	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000015
				Pyrene	0.03	mg/kg	1.25E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000035
				PCB-1254	0.014	mg/kg	5.84E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-09	4.91E-09	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00025
				PCB-1260	0.011	mg/kg	4.59E-10	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-10	3.86E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDD	0.0012	mg/kg	5.01E-11	mg/kg-day	2.4E-01	(mg/kg-day)-1	1.E-11	4.21E-10	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-BHC	0.00047	mg/kg	1.96E-11	mg/kg-day	6.3E+00	(mg/kg-day)-1	1.E-10	1.65E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000021
				beta-BHC	0.00067	mg/kg	2.80E-11	mg/kg-day	1.8E+00	(mg/kg-day)-1	5.E-11	2.35E-10	mg/kg-day	8.0E-03	1/(mg/kg-day)	0.000000029
			Exp. Route Total								3.E-06					0.2
			Dermal	Aluminum	34331	mg/kg	ND	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	ND	mg/kg-day	1.0E+00	1/(mg/kg-day)	NA
				Antimony	1.73	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-05	1/(mg/kg-day)	NA
				Arsenic	42.61	mg/kg	1.50E-06	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-06	1.05E-05	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.037
				Barium	138.9	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-02	1/(mg/kg-day)	NA
				Beryllium	1.029	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.4E-05	1/(mg/kg-day)	NA
				Boron	35.3	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.0E-01	1/(mg/kg-day)	NA
				Chromium	47.97	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.9E-05	1/(mg/kg-day)	NA
				Cobalt	17.89	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-04	1/(mg/kg-day)	NA
				Copper	22.84	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-02	1/(mg/kg-day)	NA
				Chromium VI	0.84	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-03	1/(mg/kg-day)	NA
				Lead	39.23	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	1655	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	5.6E-03	1/(mg/kg-day)	NA
				Mercury	0.679	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	2.4E-04	1/(mg/kg-day)	NA
				Nickel	20.06	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-04	1/(mg/kg-day)	NA
				Selenium	1.77	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	4.0E-03	1/(mg/kg-day)	NA
				Strontium	23.22	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	6.0E-01	1/(mg/kg-day)	NA
				Thallium	3.11	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.0E-05	1/(mg/kg-day)	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Vanadium	48.85	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	1.3E-04	1/(mg/kg-day)	NA
				Zinc	87.05	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	3.0E-01	1/(mg/kg-day)	NA
				Iron	34139	mg/kg	ND	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	ND	mg/kg-day	7.0E-01	1/(mg/kg-day)	NA
				Anthracene	0.0019	mg/kg	2.91E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-09	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.00
				Benzo(a)anthracene	0.015	mg/kg	2.29E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	2.E-09	1.61E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(a)pyrene	0.014	mg/kg	2.14E-09	mg/kg-day	7.3E+00	(mg/kg-day)-1	2.E-08	1.50E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(b)fluoranthene	0.023	mg/kg	3.52E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	3.E-09	2.46E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Benzo(k)fluoranthene	0.016	mg/kg	2.45E-09	mg/kg-day	7.3E-02	(mg/kg-day)-1	2.E-10	1.71E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Chrysene	0.018	mg/kg	2.75E-09	mg/kg-day	7.3E-03	(mg/kg-day)-1	2.E-11	1.93E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Dibenz(a,h)anthracene	0.0031	mg/kg	4.74E-10	mg/kg-day	7.3E+00	(mg/kg-day)-1	3.E-09	3.32E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Fluoranthene	0.026	mg/kg	3.98E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.78E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00000070
				Fluorene	0.0019	mg/kg	2.91E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-09	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000000051
				Indeno(1,2,3-cd)pyrene	0.0086	mg/kg	1.32E-09	mg/kg-day	7.3E-01	(mg/kg-day)-1	1.E-09	9.21E-09	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Naphthalene	0.0061	mg/kg	7.18E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.02E-09	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000025
				Phenanthrene	0.013	mg/kg	1.53E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000036
				Pyrene	0.03	mg/kg	3.53E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.47E-08	mg/kg-day	3.0E-02	1/(mg/kg-day)	0.00000082
				PCB-1254	0.014	mg/kg	2.31E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-09	1.61E-08	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.00081
				PCB-1260	0.011	mg/kg	1.81E-09	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-09	1.27E-08	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDD	0.0012	mg/kg	ND	mg/kg-day	2.4E-01	(mg/kg-day)-1	NA	ND	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-BHC	0.00047	mg/kg	ND	mg/kg-day	6.3E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
				beta-BHC	0.00067	mg/kg	ND	mg/kg-day	1.8E+00	(mg/kg-day)-1	NA	ND	mg/kg-day	8.0E-03	1/(mg/kg-day)	NA
			Exp. Route Total								2.E-06					0.04
		Exposure Point Total									5.E-06					0.3
	Exposure Medium Total										5.E-06					0.3
Medium Total											5.E-06					0.3
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Aluminum	0.125	mg/L	3.42E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.40E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000024
				Arsenic	0.00125	mg/L	3.42E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-08	2.40E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00080
				Barium	0.0395	mg/L	1.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.58E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000038
				Boron	0.0196	mg/L	5.37E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.76E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000019
				Chromium	0.00039	mg/L	1.07E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.48E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000025
				Copper	0.00182	mg/L	4.99E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.49E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000087
				Iron	0.119	mg/L	3.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.28E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000033
				Manganese	0.0342	mg/L	9.37E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.56E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00027
				Molybdenum	0.0009272	mg/L	2.54E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.78E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000036
				Nickel	0.00054319	mg/L	1.49E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000052
				Selenium	0.00038	mg/L	1.04E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.29E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000015
				Strontium	0.115	mg/L	3.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.21E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000037
				Vanadium	0.00161	mg/L	4.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000062
			Exp. Route Total								5.E-08					0.001
		Exposure Point Total									5.E-08					0.001
		Clinch River Reach B	Dermal	Aluminum	0.125	mg/L	7.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	7.04E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000070
				Arsenic	0.00125	mg/L	7.04E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	1.E-07	7.04E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00025
				Barium	0.0395	mg/L	2.22E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.22E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00016
				Boron	0.0196	mg/L	1.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.10E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000055
				Chromium	0.00039	mg/L	2.20E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.20E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00056
				Copper	0.00182	mg/L	1.02E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000026
				Iron	0.119	mg/L	6.70E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.70E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000096
				Manganese	0.0342	mg/L	1.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.93E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0020
				Molybdenum	0.0009272	mg/L	5.22E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.22E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000010
				Nickel	0.00054319	mg/L	6.11E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.11E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000076
				Selenium	0.00038	mg/L	2.14E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000053
				Strontium	0.115	mg/L	6.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.47E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000011
				Vanadium	0.00161	mg/L	9.06E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.06E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00070
			Exp. Route Total								1.E-07					0.004
	Exposure Medium Total										2.E-07					0.005
Medium Total											2.E-07					0.005
									Total of Receptor Risks Across All Media		5.E-06		Total of Receptor Hazards Across All Media			0.3

TABLE 7.71.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reach B	Ingestion													
				Barium	0.59	mg/kg	1.86E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.34E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0022
				Cobalt	0.02	mg/kg	5.58E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.30E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.043
				Copper	4.51	mg/kg	1.43E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.34E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.083
				Iron	17.58	mg/kg	5.57E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.30E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.019
				Manganese	0.86	mg/kg	2.74E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.38E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0046
				Mercury (methyl)	0.17	mg/kg	5.48E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.3
				Nickel	0.51	mg/kg	1.62E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.77E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.019
				Selenium	0.712	mg/kg	2.26E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.27E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.11
				Strontium	4.88	mg/kg	1.55E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.61E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0060
				Zinc	12.2	mg/kg	3.87E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.02E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.030
				PCB-1254	0.127	mg/kg	4.03E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-05	9.39E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	4.7
				PCB-1260	0.383	mg/kg	1.21E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-04	2.83E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0217	mg/kg	6.88E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.61E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0131	mg/kg	4.15E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	9.69E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.019
				alpha-Chlordane	0.0056	mg/kg	1.78E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-07	4.14E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0083
				Heptachlor	0.0034	mg/kg	1.08E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	2.52E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0050
			Exp. Route Total								3.E-04					6
	Exposure Medium Total										3.E-04					6
Medium Total											3.E-04					6
									Total of Receptor Risks Across All Media		3.E-04		Total of Receptor Hazards Across All Media			6

TABLE 7.72.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reach B	Ingestion													
				Barium	0.384	mg/kg	1.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0014
				Copper	0.25	mg/kg	7.93E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.85E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0046
				Manganese	1.664	mg/kg	5.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0088
				Mercury (methyl)	0.0888	mg/kg	2.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.57E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.66
				Molybdenum	0.047	mg/kg	1.49E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.48E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0070
				Selenium	1.06	mg/kg	3.36E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.84E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.16
				Strontium	4.58	mg/kg	1.45E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.39E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0056
				Vanadium	0.0715	mg/kg	2.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.29E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Zinc	14.5	mg/kg	4.60E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.036
			Exp. Route Total								0.E+00					0.9
	Exposure Medium Total										0.E+00					0.9
Medium Total											0.E+00					0.9
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.9

TABLE 7.73.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Catfish	Catfish	Clinch River Reach B	Ingestion													
				Barium	0.0659	mg/kg	2.09E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.87E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00024
				Cobalt	0.0193	mg/kg	6.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.048
				Copper	1.31	mg/kg	4.15E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.69E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.024
				Manganese	0.651	mg/kg	2.06E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.82E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0034
				Mercury (methyl)	0.3296	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.44E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	2.4
				Selenium	0.333	mg/kg	1.06E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.46E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.049
				Strontium	0.61	mg/kg	1.93E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.51E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00075
				Zinc	8.74	mg/kg	2.77E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.47E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
				PCB-1260	0.757	mg/kg	2.40E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-04	5.60E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0338	mg/kg	1.07E-05	mg/kg-day	3.4E-01	(mg/kg-day)-1	4.E-06	2.50E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0164	mg/kg	5.20E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	1.21E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.024
				alpha-Chlordane	0.0046	mg/kg	1.46E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	5.E-07	3.40E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0068
			Exp. Route Total								5.E-04					3
	Exposure Medium Total										5.E-04					3
Medium Total											5.E-04					3
							Total of Receptor Risks Across All Media				5.E-04	Total of Receptor Hazards Across All Media				3

TABLE 7.74.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Clinch River Reach B	Ingestion													
				Barium	0.59	mg/kg	1.74E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.010
				Cobalt	0.02	mg/kg	5.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.08E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.20
				Copper	4.51	mg/kg	1.33E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.56E-02	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.39
				Iron	17.58	mg/kg	5.20E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.07E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.087
				Manganese	0.86	mg/kg	2.55E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.98E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.021
				Mercury (methyl)	0.17	mg/kg	5.11E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.97E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	6.0
				Nickel	0.51	mg/kg	1.51E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-03	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.088
				Selenium	0.71	mg/kg	2.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.46E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.49
				Strontium	4.88	mg/kg	1.44E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.68E-02	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.028
				Zinc	12.20	mg/kg	3.61E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.21E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.14
				PCB-1254	0.13	mg/kg	3.76E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-05	4.38E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	22.
				PCB-1260	0.383	mg/kg	1.13E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-04	1.32E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0217	mg/kg	6.42E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	7.49E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0131	mg/kg	3.88E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	4.52E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.090
				alpha-Chlordane	0.0056	mg/kg	1.66E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-07	1.93E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.039
				Heptachlor	0.0034	mg/kg	1.01E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	1.17E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.023
			Exp. Route Total								3.E-04					29
	Exposure Medium Total										3.E-04					29
Medium Total											3.E-04					29
							Total of Receptor Risks Across All Media				3.E-04	Total of Receptor Hazards Across All Media				29

TABLE 7.75.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reach B	Ingestion													
				Barium	0.384	mg/kg	1.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0066
				Copper	0.25	mg/kg	7.40E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.63E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.022
				Manganese	1.664	mg/kg	4.92E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.74E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.041
				Mercury (methyl)	0.0888	mg/kg	2.63E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.07E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	3.1
				Molybdenum	0.047	mg/kg	1.39E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.62E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.032
				Selenium	1.06	mg/kg	3.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.66E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.73
				Strontium	4.58	mg/kg	1.36E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.58E-02	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.026
				Vanadium	0.0715	mg/kg	2.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.47E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.049
				Zinc	14.5	mg/kg	4.29E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.01E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.17
			Exp. Route Total								0.E+00					4
	Exposure Medium Total										0.E+00					4
Medium Total											0.E+00					4
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			4

TABLE 7.76.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach B	Ingestion													
				Barium	0.0659	mg/kg	1.95E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.27E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0011
				Cobalt	0.0193	mg/kg	5.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.66E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.22
				Copper	1.31	mg/kg	3.88E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.52E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.11
				Manganese	0.651	mg/kg	1.93E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.25E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.016
				Mercury (methyl)	0.3296	mg/kg	9.75E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-03	mg/kg-day	1.0E-04	1/(mg/kg-day)	11.
				Selenium	0.333	mg/kg	9.85E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.15E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.23
				Strontium	0.61	mg/kg	1.80E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.11E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0035
				Zinc	8.74	mg/kg	2.59E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.02E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.10
				PCB-1260	0.757	mg/kg	2.24E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-04	2.61E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0338	mg/kg	1.00E-05	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-06	1.17E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0164	mg/kg	4.85E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-06	5.66E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.11
				alpha-Chlordane	0.0046	mg/kg	1.36E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	5.E-07	1.59E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.032
			Exp. Route Total								5.E-04					12
	Exposure Medium Total										5.E-04					12
Medium Total											5.E-04					12
									Total of Receptor Risks Across All Media		5.E-04		Total of Receptor Hazards Across All Media			12

TABLE 7.77.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Aluminum	0.0918	mg/L	8.62E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.52E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0025
				Arsenic	0.00054829	mg/L	5.15E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	8.E-06	1.50E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.050
				Barium	0.0362	mg/L	3.40E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.92E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0050
				Boron	0.017	mg/L	1.60E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.66E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0023
				Chromium	0.00051	mg/L	4.79E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0047
				Copper	0.00099961	mg/L	9.39E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.74E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00068
				Iron	0.126	mg/L	1.18E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.45E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0049
				Manganese	0.0351	mg/L	3.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.62E-04	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.040
				Molybdenum	0.00078376	mg/L	7.36E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.15E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0043
				Nickel	0.00065	mg/L	6.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.78E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00089
				Selenium	0.00043	mg/L	4.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0024
				Strontium	0.114	mg/L	1.07E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.12E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0052
			Exp. Route Total								8.E-06					0.1
		Exposure Point Total									8.E-06					0.1
		Clinch River Reference Reach	Dermal	Aluminum	0.0918	mg/L	4.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.31E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000013
				Arsenic	0.00054829	mg/L	2.69E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	4.E-08	7.84E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00026
				Barium	0.0362	mg/L	1.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000026
				Boron	0.017	mg/L	8.34E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000012
				Chromium	0.00051	mg/L	2.50E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.29E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000024
				Copper	0.00099961	mg/L	4.90E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000036
				Iron	0.126	mg/L	6.18E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.80E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000026
				Manganese	0.0351	mg/L	1.72E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.02E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00021
				Molybdenum	0.00078376	mg/L	3.84E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000022
				Nickel	0.00065	mg/L	6.37E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000093
				Selenium	0.00043	mg/L	2.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.15E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000012
				Strontium	0.114	mg/L	5.59E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000027
			Exp. Route Total								4.E-08					0.0006
		Exposure Point Total									4.E-08					0.0006
	Exposure Medium Total										8.E-06					0.1
Medium Total											8.E-06					0.1
									Total of Receptor Risks Across All Media		8.E-06		Total of Receptor Hazards Across All Media			0.1

TABLE 7.78.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Aluminum	0.0918	mg/L	5.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.87E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0059
				Arsenic	0.00054829	mg/L	3.00E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-06	3.51E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.12
				Barium	0.0362	mg/L	1.98E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.31E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.012
				Boron	0.017	mg/L	9.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0054
				Chromium	0.00051	mg/L	2.79E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.011
				Copper	0.00099961	mg/L	5.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.39E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0016
				Iron	0.126	mg/L	6.90E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.05E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.012
				Manganese	0.0351	mg/L	1.92E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.093
				Molybdenum	0.00078376	mg/L	4.29E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.01E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.010
				Nickel	0.00065	mg/L	3.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.16E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0021
				Selenium	0.00043	mg/L	2.36E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.75E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0055
				Strontium	0.114	mg/L	6.25E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.29E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.012
			Exp. Route Total								5.E-06					0.3
		Exposure Point Total									5.E-06					0.3
		Clinch River Reference Reach	Dermal	Aluminum	0.0918	mg/L	3.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.87E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000039
				Arsenic	0.00054829	mg/L	1.98E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-08	2.31E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00077
				Barium	0.0362	mg/L	1.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.53E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000076
				Boron	0.017	mg/L	6.15E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.17E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000036
				Chromium	0.00051	mg/L	1.84E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.15E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000072
				Copper	0.00099961	mg/L	3.62E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.22E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000011
				Iron	0.126	mg/L	4.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.32E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000076
				Manganese	0.0351	mg/L	1.27E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.48E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00062
				Molybdenum	0.00078376	mg/L	2.83E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.31E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000066
				Nickel	0.00065	mg/L	4.70E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.48E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000027
				Selenium	0.00043	mg/L	1.56E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.81E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000036
				Strontium	0.114	mg/L	4.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.81E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000080
			Exp. Route Total								3.E-08					0.0019
		Exposure Point Total									3.E-08					0.0019
	Exposure Medium Total										5.E-06					0.3
Medium Total											5.E-06					0.3
							Total of Receptor Risks Across All Media				5.E-06	Total of Receptor Hazards Across All Media				0.3

TABLE 7.79.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Aluminum	0.0918	mg/L	3.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.13E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000011
				Arsenic	0.00054829	mg/L	2.32E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	3.E-08	6.76E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00023
				Barium	0.0362	mg/L	1.53E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.46E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000022
				Boron	0.017	mg/L	7.19E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.10E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000010
				Chromium	0.00051	mg/L	2.16E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.29E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000021
				Copper	0.00099961	mg/L	4.23E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000031
				Iron	0.126	mg/L	5.33E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.55E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000022
				Manganese	0.0351	mg/L	1.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.33E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00018
				Molybdenum	0.00078376	mg/L	3.31E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.66E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000019
				Nickel	0.00065	mg/L	2.75E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.01E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000040
				Selenium	0.00043	mg/L	1.82E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.30E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000011
				Strontium	0.114	mg/L	4.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000023
			Exp. Route Total								3.E-08					0.0006
		Exposure Point Total									3.E-08					0.0006
		Clinch River Reference Reach	Dermal	Aluminum	0.0918	mg/L	1.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	4.07E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000041
				Arsenic	0.00054829	mg/L	8.34E-09	mg/kg-day	1.6E+00	(mg/kg-day)-1	1.E-08	2.43E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.000085
				Barium	0.0362	mg/L	5.51E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00011
				Boron	0.017	mg/L	2.59E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.55E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000038
				Chromium	0.00051	mg/L	7.76E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.26E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00058
				Copper	0.00099961	mg/L	1.52E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.44E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000011
				Iron	0.126	mg/L	1.92E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.59E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0000080
				Manganese	0.0351	mg/L	5.34E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.56E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0016
				Molybdenum	0.00078376	mg/L	1.19E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.48E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000070
				Nickel	0.00065	mg/L	1.98E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.77E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000072
				Selenium	0.00043	mg/L	6.54E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.91E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000048
				Strontium	0.114	mg/L	1.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.06E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000084
			Exp. Route Total								1.E-08					0.002
	Exposure Medium Total										5.E-08					0.003
Medium Total											5.E-08					0.003
							Total of Receptor Risks Across All Media				5.E-08	Total of Receptor Hazards Across All Media				0.003

TABLE 7.80.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Aluminum	0.0918	mg/L	2.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	1.76E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000018
				Arsenic	0.00054829	mg/L	1.50E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	2.E-08	1.05E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00035
				Barium	0.0362	mg/L	9.92E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.94E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000035
				Boron	0.017	mg/L	4.66E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000016
				Chromium	0.00051	mg/L	1.40E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.78E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000033
				Copper	0.00099961	mg/L	2.74E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.92E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000048
				Iron	0.126	mg/L	3.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000035
				Manganese	0.0351	mg/L	9.62E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.73E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00028
				Molybdenum	0.00078376	mg/L	2.15E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.50E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000030
				Nickel	0.00065	mg/L	1.78E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000062
				Selenium	0.00043	mg/L	1.18E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.25E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000016
				Strontium	0.114	mg/L	3.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.19E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000036
			Exp. Route Total								2.E-08					0.0009
		Exposure Point Total									2.E-08					0.0009
		Clinch River Reference Reach	Dermal	Aluminum	0.0918	mg/L	7.38E-07	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	5.17E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000052
				Arsenic	0.00054829	mg/L	4.41E-09	mg/kg-day	1.6E+00	(mg/kg-day)-1	7.E-09	3.09E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00011
				Barium	0.0362	mg/L	2.91E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.04E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00015
				Boron	0.017	mg/L	1.37E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.57E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000048
				Chromium	0.00051	mg/L	4.10E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.87E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00074
				Copper	0.00099961	mg/L	8.04E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.63E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000014
				Iron	0.126	mg/L	1.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.09E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000010
				Manganese	0.0351	mg/L	2.82E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.98E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0021
				Molybdenum	0.00078376	mg/L	6.30E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.41E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000088
				Nickel	0.00065	mg/L	1.05E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.32E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000091
				Selenium	0.00043	mg/L	3.46E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000061
				Strontium	0.114	mg/L	9.17E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.42E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000011
			Exp. Route Total								7.E-09					0.003
	Exposure Medium Total										3.E-08					0.004
Medium Total											3.E-08					0.004
									Total of Receptor Risks Across All Media		3.E-08		Total of Receptor Hazards Across All Media			0.004

TABLE 7.81.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reference Reach	Ingestion													
				Chromium	0.25	mg/kg	7.96E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.062
				Cobalt	0.01	mg/kg	4.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.01E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.034
				Copper	0.37	mg/kg	1.17E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.74E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0068
				Manganese	0.22	mg/kg	6.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0012
				Mercury (methyl)	0.22	mg/kg	6.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.61E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.6
				Nickel	0.12	mg/kg	3.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.10E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0045
				Selenium	0.58	mg/kg	1.84E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.30E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.086
				Strontium	0.347	mg/kg	1.10E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00043
				Vanadium	0.0815	mg/kg	2.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.03E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.012
				Zinc	11.8	mg/kg	3.74E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.73E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.029
				PCB-1254	0.069	mg/kg	2.19E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-05	5.10E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	2.6
				PCB-1260	0.192	mg/kg	6.09E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.42E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0083	mg/kg	2.63E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	9.E-07	6.14E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-Chlordane	0.0054	mg/kg	1.71E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-07	3.99E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0080
				Heptachlor	0.0036	mg/kg	1.14E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	2.66E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0053
			Exp. Route Total								2.E-04					4
	Exposure Medium Total										2.E-04					4
Medium Total											2.E-04					4
									Total of Receptor Risks Across All Media		2.E-04		Total of Receptor Hazards Across All Media			4

TABLE 7.82.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reference Reach	Ingestion													
				Barium	0.153	mg/kg	4.85E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00057
				Boron	0.482	mg/kg	1.53E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0018
				Chromium	0.316	mg/kg	1.00E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.078
				Copper	0.256	mg/kg	8.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0047
				Manganese	3.65	mg/kg	1.16E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.70E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.019
				Mercury (methyl)	0.12256	mg/kg	3.89E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.07E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.91
				Nickel	0.141	mg/kg	4.47E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0052
				Selenium	0.676	mg/kg	2.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.00E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.10
				Strontium	2.4	mg/kg	7.61E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.78E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0030
				Zinc	15.7	mg/kg	4.98E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.16E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.039
			Exp. Route Total								0.E+00					1
	Exposure Medium Total										0.E+00					1
Medium Total											0.E+00					1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1

TABLE 7.83.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reference Reach	Ingestion													
				Barium	0.206	mg/kg	6.53E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00076
				Cadmium	0.0196	mg/kg	6.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.029
				Cobalt	0.0219	mg/kg	6.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.62E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.054
				Copper	1.75	mg/kg	5.55E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.032
				Manganese	1.17	mg/kg	3.71E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.65E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0062
				Mercury (methyl)	0.1936	mg/kg	6.14E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.4
				Nickel	0.274	mg/kg	8.69E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.010
				Selenium	0.293	mg/kg	9.29E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.17E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.043
				Strontium	4.536	mg/kg	1.44E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.36E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0056
				Zinc	8.21	mg/kg	2.60E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.07E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.020
				PCB-1254	0.189	mg/kg	5.99E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	1.40E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	7.0
				PCB-1260	0.441	mg/kg	1.40E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-04	3.26E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0288	mg/kg	9.13E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-06	2.13E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0128	mg/kg	4.06E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	9.47E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.019
				alpha-Chlordane	0.014	mg/kg	4.44E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	2.E-06	1.04E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.021
				gamma-Chlordane	0.0084	mg/kg	2.66E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	9.E-07	6.21E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.012
				Heptachlor	0.0035	mg/kg	1.11E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	2.59E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0052
			Exp. Route Total								4.E-04					9
	Exposure Medium Total										4.E-04					9
Medium Total											4.E-04					9
									Total of Receptor Risks Across All Media		4.E-04		Total of Receptor Hazards Across All Media			9

TABLE 7.84.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reference Reach	Ingestion													
				Barium	0.054	mg/kg	1.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.99E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00020
				Copper	0.205	mg/kg	6.50E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0038
				Manganese	0.432	mg/kg	1.37E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.20E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0023
				Mercury (methyl)	0.2336	mg/kg	7.41E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.73E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.7
				Selenium	0.399	mg/kg	1.26E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.95E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.059
				Strontium	0.907	mg/kg	2.88E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.71E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0011
				Zinc	6.825	mg/kg	2.16E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.05E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.017
			Exp. Route Total								0.E+00					2
	Exposure Medium Total										0.E+00					2
Medium Total											0.E+00					2
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			2

TABLE 7.85.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Clinch River Reference Reach	Ingestion													
				Chromium	0.25	mg/kg	7.43E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.66E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.29
				Cobalt	0.01	mg/kg	4.02E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.69E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.16
				Copper	0.37	mg/kg	1.09E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.032
				Manganese	0.22	mg/kg	6.45E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.53E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0054
				Mercury (methyl)	0.22	mg/kg	6.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.51E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	7.5
				Nickel	0.12	mg/kg	3.64E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.25E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.021
				Selenium	0.58	mg/kg	1.72E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.01E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.40
				Strontium	0.35	mg/kg	1.03E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0020
				Vanadium	0.08	mg/kg	2.41E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.81E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.056
				Zinc	11.80	mg/kg	3.49E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.07E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.14
				PCB-1254	0.07	mg/kg	2.04E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-05	2.38E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	12.
				PCB-1260	0.192	mg/kg	5.68E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	6.63E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0083	mg/kg	2.46E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-07	2.87E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-Chlordane	0.0054	mg/kg	1.60E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-07	1.86E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.037
				Heptachlor	0.0036	mg/kg	1.07E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	1.24E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.025
			Exp. Route Total								2.E-04					21
	Exposure Medium Total										2.E-04					21
Medium Total											2.E-04					21
									Total of Receptor Risks Across All Media		2.E-04		Total of Receptor Hazards Across All Media			21

TABLE 7.86.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Clinch River Reference Reach	Ingestion													
				Barium	0.153	mg/kg	4.53E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0026
				Boron	0.482	mg/kg	1.43E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0083
				Chromium	0.316	mg/kg	9.35E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-03	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.36
				Copper	0.256	mg/kg	7.57E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.84E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.022
				Manganese	3.65	mg/kg	1.08E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-02	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.090
				Mercury (methyl)	0.12256	mg/kg	3.63E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.23E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	4.2
				Nickel	0.141	mg/kg	4.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.87E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.024
				Selenium	0.676	mg/kg	2.00E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.33E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.47
				Strontium	2.4	mg/kg	7.10E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.28E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.014
				Zinc	15.7	mg/kg	4.65E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.42E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.18
			Exp. Route Total								0.E+00					5
	Exposure Medium Total										0.E+00					5
Medium Total											0.E+00					5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			5

TABLE 7.87.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reference Reach	Ingestion													
				Barium	0.206	mg/kg	6.10E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.11E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0036
				Cadmium	0.0196	mg/kg	5.80E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.77E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.14
				Cobalt	0.0219	mg/kg	6.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.56E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.25
				Copper	1.75	mg/kg	5.18E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.04E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.15
				Manganese	1.17	mg/kg	3.46E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.04E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.029
				Mercury (methyl)	0.1936	mg/kg	5.73E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.68E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	6.7
				Nickel	0.274	mg/kg	8.11E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.46E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.047
				Selenium	0.293	mg/kg	8.67E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.01E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.20
				Strontium	4.536	mg/kg	1.34E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.57E-02	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.026
				Zinc	8.21	mg/kg	2.43E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.83E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.094
				PCB-1254	0.189	mg/kg	5.59E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-04	6.52E-04	mg/kg-day	2.0E-05	1/(mg/kg-day)	33.
				PCB-1260	0.441	mg/kg	1.30E-04	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-04	1.52E-03	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0288	mg/kg	8.52E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-06	9.94E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0128	mg/kg	3.79E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-06	4.42E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.088
				alpha-Chlordane	0.014	mg/kg	4.14E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-06	4.83E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.097
				gamma-Chlordane	0.0084	mg/kg	2.49E-06	mg/kg-day	3.5E-01	(mg/kg-day)-1	9.E-07	2.90E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.058
				Heptachlor	0.0035	mg/kg	1.04E-06	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-06	1.21E-05	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.024
			Exp. Route Total								4.E-04					41
	Exposure Medium Total										4.E-04					41
Medium Total											4.E-04					41
							Total of Receptor Risks Across All Media				4.E-04	Total of Receptor Hazards Across All Media				41

TABLE 7.88.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reference Reach	Ingestion													
				Barium	0.054	mg/kg	1.60E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00093
				Copper	0.205	mg/kg	6.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.08E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.018
				Manganese	0.432	mg/kg	1.28E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.49E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.011
				Mercury (methyl)	0.2336	mg/kg	6.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.06E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	8.1
				Selenium	0.399	mg/kg	1.18E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-03	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.28
				Strontium	0.907	mg/kg	2.68E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.13E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0052
				Zinc	6.825	mg/kg	2.02E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.36E-02	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.079
			Exp. Route Total								0.E+00					8
	Exposure Medium Total										0.E+00					8
Medium Total											0.E+00					8
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				8

TABLE 7.89.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Aluminum	0.167	mg/L	1.57E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.58E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0046
				Arsenic	0.00097102	mg/L	9.12E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-05	2.66E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.089
				Barium	0.0331	mg/L	3.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.07E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0045
				Beryllium	0.00048	mg/L	4.51E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.32E-05	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.0066
				Boron	0.0164	mg/L	1.54E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.49E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0022
				Chromium	0.00043	mg/L	4.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0039
				Copper	0.00134	mg/L	1.26E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.67E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00092
				Iron	0.164	mg/L	1.54E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.49E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0064
				Manganese	0.0692	mg/L	6.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.079
				Molybdenum	0.00055125	mg/L	5.18E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.51E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0030
				Nickel	0.00113	mg/L	1.06E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.10E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0015
				Strontium	0.0919	mg/L	8.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.52E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0042
				Vanadium	0.00153	mg/L	1.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.19E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0084
			Exp. Route Total								1.E-05					0.2
		Exposure Point Total									1.E-05					0.2
		Tennessee River Reach B	Dermal	Aluminum	0.167	mg/L	8.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.39E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000024
				Arsenic	0.00097102	mg/L	4.76E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-08	1.39E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00046
				Barium	0.0331	mg/L	1.62E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.73E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000024
				Beryllium	0.00048	mg/L	2.35E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.86E-08	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.000034
				Boron	0.0164	mg/L	8.04E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.35E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000012
				Chromium	0.00043	mg/L	2.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.15E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000020
				Copper	0.00134	mg/L	6.57E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.92E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000048
				Iron	0.164	mg/L	8.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.35E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000034
				Manganese	0.0692	mg/L	3.39E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.90E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00041
				Molybdenum	0.00055125	mg/L	2.70E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.88E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000016
				Nickel	0.00113	mg/L	1.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.23E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000016
				Strontium	0.0919	mg/L	4.51E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.31E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000022
				Vanadium	0.00153	mg/L	7.50E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.19E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000044
			Exp. Route Total								7.E-08					0.001
		Exposure Point Total									1.E-05					0.001
	Exposure Medium Total										1.E-05					0.2
Medium Total											1.E-05					0.2
							Total of Receptor Risks Across All Media				1.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.90.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Aluminum	0.167	mg/L	9.15E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-02	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.011
				Arsenic	0.00097102	mg/L	5.32E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	8.E-06	6.21E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.21
				Barium	0.0331	mg/L	1.81E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.011
				Beryllium	0.00048	mg/L	2.63E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.07E-05	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.015
				Boron	0.0164	mg/L	8.99E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0052
				Chromium	0.00043	mg/L	2.36E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.75E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0092
				Copper	0.00134	mg/L	7.34E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.57E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0021
				Iron	0.164	mg/L	8.99E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.015
				Manganese	0.0692	mg/L	3.79E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.42E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.18
				Molybdenum	0.00055125	mg/L	3.02E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.52E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0070
				Nickel	0.00113	mg/L	6.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.22E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0036
				Strontium	0.0919	mg/L	5.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.87E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0098
				Vanadium	0.00153	mg/L	8.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.78E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.020
			Exp. Route Total								8.E-06					0.5
		Exposure Point Total									8.E-06					0.5
		Tennessee River Reach B	Dermal	Aluminum	0.167	mg/L	6.04E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.05E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000070
				Arsenic	0.00097102	mg/L	3.51E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-08	4.10E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0014
				Barium	0.0331	mg/L	1.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000070
				Beryllium	0.00048	mg/L	1.74E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-07	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.00010
				Boron	0.0164	mg/L	5.93E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.92E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000035
				Chromium	0.00043	mg/L	1.56E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.81E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000060
				Copper	0.00134	mg/L	4.85E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.65E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000014
				Iron	0.164	mg/L	5.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.92E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000099
				Manganese	0.0692	mg/L	2.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.92E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0012
				Molybdenum	0.00055125	mg/L	1.99E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.33E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000047
				Nickel	0.00113	mg/L	8.17E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.54E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000048
				Strontium	0.0919	mg/L	3.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.88E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000065
				Vanadium	0.00153	mg/L	5.53E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.46E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00013
			Exp. Route Total								5.E-08					0.003
		Exposure Point Total									8.E-06					0.003
	Exposure Medium Total										8.E-06					0.5
Medium Total											8.E-06					0.5
							Total of Receptor Risks Across All Media				8.E-06	Total of Receptor Hazards Across All Media				0.5

TABLE 7.91.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Aluminum	0.167	mg/L	7.06E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	2.06E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000021
				Arsenic	0.00097102	mg/L	4.10E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	6.E-08	1.20E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00040
				Barium	0.0331	mg/L	1.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000020
				Beryllium	0.00048	mg/L	2.03E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.92E-08	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.000030
				Boron	0.0164	mg/L	6.93E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.02E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000010
				Chromium	0.00043	mg/L	1.82E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.30E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000018
				Copper	0.00134	mg/L	5.66E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.65E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000041
				Iron	0.164	mg/L	6.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.02E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000029
				Manganese	0.0692	mg/L	2.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.53E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00036
				Molybdenum	0.00055125	mg/L	2.33E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.80E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000014
				Nickel	0.00113	mg/L	4.78E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000070
				Strontium	0.0919	mg/L	3.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000019
				Vanadium	0.00153	mg/L	6.47E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000038
			Exp. Route Total								6.E-08					0.001
		Exposure Point Total									6.E-08					0.001
		Tennessee River Reach B	Dermal	Aluminum	0.167	mg/L	2.54E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	7.41E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000074
				Arsenic	0.00097102	mg/L	1.48E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-08	4.31E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00015
				Barium	0.0331	mg/L	5.04E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00010
				Beryllium	0.00048	mg/L	7.30E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.13E-08	mg/kg-day	1.4E-05	1/(mg/kg-day)	0.0015
				Boron	0.0164	mg/L	2.50E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.28E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000036
				Chromium	0.00043	mg/L	6.54E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.91E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00049
				Copper	0.00134	mg/L	2.04E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.95E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000015
				Iron	0.164	mg/L	2.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.28E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000010
				Manganese	0.0692	mg/L	1.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.07E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0032
				Molybdenum	0.00055125	mg/L	8.39E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000049
				Nickel	0.00113	mg/L	3.44E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.00E-08	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.000013
				Strontium	0.0919	mg/L	8.39E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000068
				Vanadium	0.00153	mg/L	2.33E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.79E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00052
			Exp. Route Total								2.E-08					0.006
	Exposure Medium Total										8.E-08					0.007
Medium Total											8.E-08					0.007
									Total of Receptor Risks Across All Media		8.E-08		Total of Receptor Hazards Across All Media			0.007

TABLE 7.92.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Aluminum	0.167	mg/L	4.58E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	3.20E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000032
				Arsenic	0.00097102	mg/L	2.66E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	4.E-08	1.86E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00062
				Barium	0.0331	mg/L	9.07E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.35E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000032
				Beryllium	0.00048	mg/L	1.32E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.21E-08	mg/kg-day	2.0E-03	1/(mg/kg-day)	0.000046
				Boron	0.0164	mg/L	4.49E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.15E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000016
				Chromium	0.00043	mg/L	1.18E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.25E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000027
				Copper	0.00134	mg/L	3.67E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000064
				Iron	0.164	mg/L	4.49E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.15E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000045
				Manganese	0.0692	mg/L	1.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00055
				Molybdenum	0.00055125	mg/L	1.51E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000021
				Nickel	0.00113	mg/L	3.10E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.17E-07	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.000011
				Strontium	0.0919	mg/L	2.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000029
				Vanadium	0.00153	mg/L	4.19E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.93E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000059
			Exp. Route Total								4.E-08					0.001
		Exposure Point Total									4.E-08					0.001
		Tennessee River Reach B	Dermal	Aluminum	0.167	mg/L	9.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	9.40E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000094
				Arsenic	0.00097102	mg/L	5.47E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	9.E-08	5.47E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00019
				Barium	0.0331	mg/L	1.86E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00013
				Beryllium	0.00048	mg/L	2.70E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.70E-08	mg/kg-day	1.4E-05	1/(mg/kg-day)	0.0019
				Boron	0.0164	mg/L	9.23E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.23E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000046
				Chromium	0.00043	mg/L	2.42E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00062
				Copper	0.00134	mg/L	7.54E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.54E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000019
				Iron	0.164	mg/L	9.23E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.23E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000013
				Manganese	0.0692	mg/L	3.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.90E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0041
				Molybdenum	0.00055125	mg/L	3.10E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.10E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000062
				Nickel	0.00113	mg/L	1.27E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.27E-08	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.000016
				Strontium	0.0919	mg/L	5.17E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.17E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000086
				Vanadium	0.00153	mg/L	8.61E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.61E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00066
			Exp. Route Total								9.E-08					0.008
	Exposure Medium Total										1.E-07					0.009
Medium Total											1.E-07					0.009
							Total of Receptor Risks Across All Media				1.E-07	Total of Receptor Hazards Across All Media				0.009

TABLE 7.93.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Aluminum	0.152	mg/L	1.43E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.16E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0042
				Arsenic	0.00088324	mg/L	8.30E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	1.E-05	2.42E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.081
				Barium	0.0335	mg/L	3.15E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.18E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0046
				Boron	0.0166	mg/L	1.56E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.55E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0023
				Chromium	0.00038	mg/L	3.57E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0035
				Copper	0.00097212	mg/L	9.13E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.66E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00067
				Iron	0.169	mg/L	1.59E-03	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.63E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0066
				Manganese	0.0653	mg/L	6.13E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.79E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.075
				Molybdenum	0.00058	mg/L	5.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.59E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0032
				Nickel	0.00049375	mg/L	4.64E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.35E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00068
				Selenium	0.00045	mg/L	4.23E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0025
				Strontium	0.0968	mg/L	9.09E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0044
				Vanadium	0.00122	mg/L	1.15E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.34E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0067
			Exp. Route Total								1.E-05					0.2
		Exposure Point Total									1.E-05					0.2
		Tennessee River Reference Reach	Dermal	Aluminum	0.152	mg/L	7.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.17E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000022
				Arsenic	0.00088324	mg/L	4.33E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	6.E-08	1.26E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00042
				Barium	0.0335	mg/L	1.64E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.79E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000024
				Boron	0.0166	mg/L	8.14E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.37E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000012
				Chromium	0.00038	mg/L	1.86E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.43E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000018
				Copper	0.00097212	mg/L	4.77E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000035
				Iron	0.169	mg/L	8.29E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000035
				Manganese	0.0653	mg/L	3.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.34E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00039
				Molybdenum	0.00058	mg/L	2.84E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.29E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000017
				Nickel	0.00049375	mg/L	4.84E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00000071
				Selenium	0.00045	mg/L	2.21E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.44E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000013
				Strontium	0.0968	mg/L	4.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000023
				Vanadium	0.00122	mg/L	5.98E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.74E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000035
			Exp. Route Total								6.E-08					0.001
		Exposure Point Total									6.E-08					0.001
	Exposure Medium Total										1.E-05					0.2
Medium Total											1.E-05					0.2
							Total of Receptor Risks Across All Media				1.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.94.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Aluminum	0.152	mg/L	8.33E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.72E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0097
				Arsenic	0.00088324	mg/L	4.84E-06	mg/kg-day	1.5E+00	(mg/kg-day)-1	7.E-06	5.65E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.19
				Barium	0.0335	mg/L	1.84E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.011
				Boron	0.0166	mg/L	9.10E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-03	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0053
				Chromium	0.00038	mg/L	2.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.43E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0081
				Copper	0.00097212	mg/L	5.33E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.21E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0016
				Iron	0.169	mg/L	9.26E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-02	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.015
				Manganese	0.0653	mg/L	3.58E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.17E-03	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.17
				Molybdenum	0.00058	mg/L	3.18E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.71E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0074
				Nickel	0.00049375	mg/L	2.71E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.16E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0016
				Selenium	0.00045	mg/L	2.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.88E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0058
				Strontium	0.0968	mg/L	5.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.19E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.010
				Vanadium	0.00122	mg/L	6.68E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.80E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.016
			Exp. Route Total								7.E-06					0.5
		Exposure Point Total									7.E-06					0.5
		Tennessee River Reference Reach	Dermal	Aluminum	0.152	mg/L	5.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.41E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000064
				Arsenic	0.00088324	mg/L	3.19E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	5.E-08	3.73E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0012
				Barium	0.0335	mg/L	1.21E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000071
				Boron	0.0166	mg/L	6.00E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.00E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000035
				Chromium	0.00038	mg/L	1.37E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-07	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000053
				Copper	0.00097212	mg/L	3.52E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.10E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.000010
				Iron	0.169	mg/L	6.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.13E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.00010
				Manganese	0.0653	mg/L	2.36E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.76E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.0011
				Molybdenum	0.00058	mg/L	2.10E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000049
				Nickel	0.00049375	mg/L	3.57E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.17E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000021
				Selenium	0.00045	mg/L	1.63E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000038
				Strontium	0.0968	mg/L	3.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000068
				Vanadium	0.00122	mg/L	4.41E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.15E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00010
			Exp. Route Total								5.E-08					0.003
		Exposure Point Total									5.E-08					0.003
	Exposure Medium Total										7.E-06					0.5
Medium Total											7.E-06					0.5
									Total of Receptor Risks Across All Media		7.E-06		Total of Receptor Hazards Across All Media			0.5

TABLE 7.95.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Aluminum	0.152	mg/L	6.43E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	1.87E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000019
				Arsenic	0.00088324	mg/L	3.73E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	6.E-08	1.09E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00036
				Barium	0.0335	mg/L	1.42E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.13E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000021
				Boron	0.0166	mg/L	7.02E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.05E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000010
				Chromium	0.00038	mg/L	1.61E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.68E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000016
				Copper	0.00097212	mg/L	4.11E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.20E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000030
				Iron	0.169	mg/L	7.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000030
				Manganese	0.0653	mg/L	2.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.05E-06	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00034
				Molybdenum	0.00058	mg/L	2.45E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000014
				Nickel	0.00049375	mg/L	2.09E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.09E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000030
				Selenium	0.00045	mg/L	1.90E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.55E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000011
				Strontium	0.0968	mg/L	4.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.19E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000020
				Vanadium	0.00122	mg/L	5.16E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.50E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000030
			Exp. Route Total								6.E-08					0.0009
		Exposure Point Total									6.E-08					0.0009
		Tennessee River Reference Reach	Dermal	Aluminum	0.152	mg/L	2.31E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	6.75E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000067
				Arsenic	0.00088324	mg/L	1.34E-08	mg/kg-day	1.6E+00	(mg/kg-day)-1	2.E-08	3.92E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00014
				Barium	0.0335	mg/L	5.10E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.49E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00011
				Boron	0.0166	mg/L	2.53E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.37E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000037
				Chromium	0.00038	mg/L	5.78E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.69E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00043
				Copper	0.00097212	mg/L	1.48E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.31E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000011
				Iron	0.169	mg/L	2.57E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.50E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000011
				Manganese	0.0653	mg/L	9.94E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.90E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0030
				Molybdenum	0.00058	mg/L	8.83E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000051
				Nickel	0.00049375	mg/L	1.50E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.38E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000055
				Selenium	0.00045	mg/L	6.85E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000050
				Strontium	0.0968	mg/L	8.84E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.30E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000072
				Vanadium	0.00122	mg/L	1.86E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.41E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00042
			Exp. Route Total								2.E-08					0.004
	Exposure Medium Total										8.E-08					0.005
Medium Total											8.E-08					0.005
									Total of Receptor Risks Across All Media		8.E-08		Total of Receptor Hazards Across All Media			0.005

TABLE 7.96.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Aluminum	0.152	mg/L	4.16E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	2.92E-05	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.000029
				Arsenic	0.00088324	mg/L	2.42E-08	mg/kg-day	1.5E+00	(mg/kg-day)-1	4.E-08	1.69E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00056
				Barium	0.0335	mg/L	9.18E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.42E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000032
				Boron	0.0166	mg/L	4.55E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.18E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000016
				Chromium	0.00038	mg/L	1.04E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.29E-08	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.000024
				Copper	0.00097212	mg/L	2.66E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-07	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000047
				Iron	0.169	mg/L	4.63E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.24E-05	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000046
				Manganese	0.0653	mg/L	1.79E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-05	mg/kg-day	2.4E-02	1/(mg/kg-day)	0.00052
				Molybdenum	0.00058	mg/L	1.59E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.11E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000022
				Nickel	0.00049375	mg/L	1.35E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.47E-08	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0000047
				Selenium	0.00045	mg/L	1.23E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.63E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000017
				Strontium	0.0968	mg/L	2.65E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000031
				Vanadium	0.00122	mg/L	3.34E-08	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000047
			Exp. Route Total								4.E-08					0.001
		Exposure Point Total									4.E-08					0.001
		Tennessee River Reference Reach	Dermal	Aluminum	0.152	mg/L	1.22E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	8.56E-06	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0000086
				Arsenic	0.00088324	mg/L	7.10E-09	mg/kg-day	1.6E+00	(mg/kg-day)-1	1.E-08	4.97E-08	mg/kg-day	2.9E-04	1/(mg/kg-day)	0.00017
				Barium	0.0335	mg/L	2.69E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-06	mg/kg-day	1.4E-02	1/(mg/kg-day)	0.00013
				Boron	0.0166	mg/L	1.33E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.34E-07	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0000047
				Chromium	0.00038	mg/L	3.06E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-08	mg/kg-day	3.9E-05	1/(mg/kg-day)	0.00055
				Copper	0.00097212	mg/L	7.82E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.47E-08	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0000014
				Iron	0.169	mg/L	1.36E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.51E-06	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.000014
				Manganese	0.0653	mg/L	5.25E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.68E-06	mg/kg-day	9.6E-04	1/(mg/kg-day)	0.0038
				Molybdenum	0.00058	mg/L	4.66E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.26E-08	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0000065
				Nickel	0.00049375	mg/L	7.94E-10	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.56E-09	mg/kg-day	8.0E-04	1/(mg/kg-day)	0.0000069
				Selenium	0.00045	mg/L	3.62E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-08	mg/kg-day	4.0E-03	1/(mg/kg-day)	0.0000063
				Strontium	0.0968	mg/L	7.78E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.45E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000091
				Vanadium	0.00122	mg/L	9.81E-09	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.87E-08	mg/kg-day	1.3E-04	1/(mg/kg-day)	0.00053
			Exp. Route Total								1.E-08					0.005
	Exposure Medium Total										5.E-08					0.007
Medium Total											5.E-08					0.007
							Total of Receptor Risks Across All Media				5.E-08	Total of Receptor Hazards Across All Media				0.007

TABLE 7.97.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Arsenic	0.005	mg/kg	1.91E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	3.E-07	4.45E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0015
				Barium	0.06	mg/kg	2.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.99E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000025
				Copper	0.34	mg/kg	1.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.05E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00076
				Manganese	0.22	mg/kg	8.24E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.92E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00014
				Mercury (methyl)	0.35	mg/kg	1.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.31
				Selenium	0.73	mg/kg	2.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.50E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.013
				Strontium	0.35	mg/kg	1.35E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.14E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000052
				Zinc	12.70	mg/kg	4.85E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0038
				PCB-1260	0.15	mg/kg	5.80E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	1.35E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	2.48E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-08	5.79E-07	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	1.98E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	7.E-08	4.63E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00093
			Exp. Route Total								1.E-05					0.3
	Exposure Medium Total										1.E-05					0.3
Medium Total											1.E-05					0.3
									Total of Receptor Risks Across All Media		1.E-05		Total of Receptor Hazards Across All Media			0.3

TABLE 7.98.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach A	Ingestion													
				Barium	0.121	mg/kg	4.62E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000054
				Chromium	0.27	mg/kg	1.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.40E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0080
				Copper	0.456	mg/kg	1.74E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.06E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0010
				Iron	13.9	mg/kg	5.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.24E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0018
				Manganese	0.568	mg/kg	2.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.06E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00036
				Mercury (methyl)	0.11632	mg/kg	4.44E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.10
				Nickel	0.16	mg/kg	6.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.42E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00071
				Selenium	0.967	mg/kg	3.69E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.61E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.017
				Silver	0.0183	mg/kg	6.98E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.63E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00033
				Strontium	0.879	mg/kg	3.35E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.83E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00013
				Vanadium	0.059	mg/kg	2.25E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.25E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0011
				Zinc	16.2	mg/kg	6.18E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0048
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.1

TABLE 7.99.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Arsenic	0.01	mg/kg	3.43E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	5.E-07	8.01E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0027
				Barium	0.17	mg/kg	6.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.53E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000077
				Cadmium	0.02	mg/kg	6.87E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0032
				Cobalt	0.02	mg/kg	6.18E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0048
				Copper	5.64	mg/kg	2.15E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.02E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.013
				Manganese	0.51	mg/kg	1.94E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.52E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00032
				Mercury (methyl)	0.14	mg/kg	5.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.12
				Nickel	0.25	mg/kg	9.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.26E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0011
				Selenium	0.41	mg/kg	1.57E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.66E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0073
				Strontium	0.53	mg/kg	2.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.75E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000079
				Zinc	8.74	mg/kg	3.34E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.78E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0026
				PCB-1254	0.121	mg/kg	4.62E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-06	1.08E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.54
				PCB-1260	0.309	mg/kg	1.18E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	2.75E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0154	mg/kg	5.88E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.37E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0093	mg/kg	3.55E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	8.28E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0017
				alpha-Chlordane	0.009	mg/kg	3.43E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	8.01E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0016
				gamma-Chlordane	0.0057	mg/kg	2.18E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	8.E-08	5.08E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0010
			Exp. Route Total								3.E-05					0.7
	Exposure Medium Total										3.E-05					0.7
Medium Total											3.E-05					0.7
									Total of Receptor Risks Across All Media		3.E-05		Total of Receptor Hazards Across All Media			0.7

TABLE 7.100.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach A	Ingestion													
				Copper	0.21	mg/kg	8.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.87E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00047
				Iron	17.47	mg/kg	6.67E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.56E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0022
				Manganese	0.218	mg/kg	8.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00014
				Mercury (methyl)	0.15152	mg/kg	5.78E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.35E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.13
				Selenium	0.536	mg/kg	2.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.77E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0095
				Strontium	0.327	mg/kg	1.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.91E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000049
				Zinc	9.51	mg/kg	3.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.47E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0028
			Exp. Route Total								0.E+00					0.2
	Exposure Medium Total										0.E+00					0.2
Medium Total											0.E+00					0.2
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.2

TABLE 7.101.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Arsenic	0.01	mg/kg	1.78E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.E-07	2.08E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0069
				Barium	0.06	mg/kg	1.99E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.33E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00012
				Copper	0.34	mg/kg	1.22E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.42E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0036
				Manganese	0.22	mg/kg	7.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.98E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00064
				Mercury (methyl)	0.35	mg/kg	1.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.4
				Selenium	0.73	mg/kg	2.60E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.03E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.061
				Strontium	0.35	mg/kg	1.26E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.47E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00024
				Zinc	12.70	mg/kg	4.52E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.018
				PCB-1260	0.15	mg/kg	5.41E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	6.32E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	2.32E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-08	2.70E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	1.85E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	6.E-08	2.16E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0043
			Exp. Route Total								1.E-05					2
	Exposure Medium Total										1.E-05					2
Medium Total											1.E-05					2
									Total of Receptor Risks Across All Media		1.E-05		Total of Receptor Hazards Across All Media			2

TABLE 7.102.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach A	Ingestion													
				Barium	0.121	mg/kg	4.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.03E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00025
				Chromium	0.27	mg/kg	9.62E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.037
				Copper	0.456	mg/kg	1.62E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0047
				Iron	13.9	mg/kg	4.95E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.78E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0083
				Manganese	0.568	mg/kg	2.02E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.36E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0017
				Mercury (methyl)	0.11632	mg/kg	4.14E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.83E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.48
				Nickel	0.16	mg/kg	5.70E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.65E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0033
				Selenium	0.967	mg/kg	3.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.02E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.080
				Silver	0.0183	mg/kg	6.52E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.60E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0015
				Strontium	0.879	mg/kg	3.13E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.65E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00061
				Vanadium	0.059	mg/kg	2.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.45E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0049
				Zinc	16.2	mg/kg	5.77E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.73E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
			Exp. Route Total								0.E+00					0.6
	Exposure Medium Total										0.E+00					0.6
Medium Total											0.E+00					0.6
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.6

TABLE 7.103.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Arsenic	0.01	mg/kg	3.21E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	5.E-07	3.74E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.012
				Barium	0.17	mg/kg	6.13E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.15E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00036
				Cadmium	0.02	mg/kg	6.41E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.48E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.015
				Cobalt	0.02	mg/kg	5.77E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.73E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.022
				Copper	5.64	mg/kg	2.01E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.34E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.059
				Manganese	0.51	mg/kg	1.81E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.11E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0015
				Mercury (methyl)	0.14	mg/kg	4.84E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.65E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.57
				Nickel	0.25	mg/kg	9.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0053
				Selenium	0.41	mg/kg	1.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.71E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.034
				Strontium	0.53	mg/kg	1.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.21E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00037
				Zinc	8.74	mg/kg	3.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.63E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.012
				PCB-1254	0.121	mg/kg	4.31E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-06	5.03E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	2.5
				PCB-1260	0.309	mg/kg	1.10E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	1.28E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0154	mg/kg	5.48E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	6.40E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0093	mg/kg	3.31E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	3.86E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0077
				alpha-Chlordane	0.009	mg/kg	3.21E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	3.74E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0075
				gamma-Chlordane	0.0057	mg/kg	2.03E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-08	2.37E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0047
			Exp. Route Total								3.E-05					3.3
	Exposure Medium Total										3.E-05					3
Medium Total											3.E-05					3
									Total of Receptor Risks Across All Media		3.E-05		Total of Receptor Hazards Across All Media			3

TABLE 7.104.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach A	Ingestion													
				Copper	0.21	mg/kg	7.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.73E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0022
				Iron	17.47	mg/kg	6.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.26E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.010
				Manganese	0.218	mg/kg	7.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.06E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00065
				Mercury (methyl)	0.15152	mg/kg	5.40E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.30E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.63
				Selenium	0.536	mg/kg	1.91E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.23E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.045
				Strontium	0.327	mg/kg	1.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.36E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00023
				Zinc	9.51	mg/kg	3.39E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.95E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.013
			Exp. Route Total								0.E+00					0.7
	Exposure Medium Total										0.E+00					0.7
Medium Total											0.E+00					0.7
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.7

TABLE 7.105.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Emory River Reach B	Ingestion													
				Cobalt	0.02	mg/kg	6.14E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0048
				Copper	3.21	mg/kg	1.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.86E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0071
				Lead	0.24	mg/kg	9.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	0.20	mg/kg	7.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00013
				Mercury (methyl)	0.20	mg/kg	7.51E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.18
				Nickel	0.76	mg/kg	2.88E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.73E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0034
				Selenium	0.77	mg/kg	2.93E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.85E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.014
				Strontium	0.22	mg/kg	8.47E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.98E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000033
				Zinc	11.00	mg/kg	4.20E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.79E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0033
				PCB-1260	0.15	mg/kg	5.80E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	1.35E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	2.79E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	9.E-08	6.50E-07	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								1.E-05					0.2
	Exposure Medium Total										1.E-05					0.2
Medium Total											1.E-05					0.2
									Total of Receptor Risks Across All Media		1.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.106.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Emory River Reach B	Ingestion													
				Barium	0.128	mg/kg	4.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000057
				Chromium	0.151	mg/kg	5.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.34E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0045
				Cobalt	0.016	mg/kg	6.11E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.42E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0047
				Copper	0.332	mg/kg	1.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.96E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00074
				Manganese	0.733	mg/kg	2.80E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.53E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00047
				Mercury (methyl)	0.1056	mg/kg	4.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.40E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.094
				Nickel	0.175	mg/kg	6.68E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.56E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00078
				Selenium	0.879	mg/kg	3.35E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.83E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.016
				Strontium	1.4	mg/kg	5.34E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00021
				Zinc	13.2	mg/kg	5.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0039
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				0.1

TABLE 7.107.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion													
				Barium	0.10	mg/kg	3.67E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.57E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000043
				Cobalt	0.03	mg/kg	9.62E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0075
				Copper	0.48	mg/kg	1.84E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.28E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0011
				Manganese	0.53	mg/kg	2.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.75E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00034
				Mercury (methyl)	0.14	mg/kg	5.37E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.25E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.13
				Nickel	0.10	mg/kg	3.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.90E-06	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00045
				Selenium	0.40	mg/kg	1.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.60E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0072
				Strontium	0.65	mg/kg	2.47E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.77E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000096
				Zinc	6.90	mg/kg	2.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.14E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0020
				PCB-1254	0.10	mg/kg	3.68E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-06	8.59E-06	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.43
				PCB-1260	0.296	mg/kg	1.13E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	2.64E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0135	mg/kg	5.15E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.20E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0084	mg/kg	3.21E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	7.48E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0015
				alpha-Chlordane	0.0049	mg/kg	1.87E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-08	4.36E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00087
			Exp. Route Total								3.E-05					0.6
	Exposure Medium Total										3.E-05					0.6
Medium Total											3.E-05					0.6
							Total of Receptor Risks Across All Media				3.E-05	Total of Receptor Hazards Across All Media				0.6

TABLE 7.108.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reach B	Ingestion													
				Copper	2.64	mg/kg	1.01E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.35E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0059
				Mercury (methyl)	0.2208	mg/kg	8.43E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.97E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.20
				Nickel	0.508	mg/kg	1.94E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.52E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0023
				Selenium	0.638	mg/kg	2.43E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.68E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Strontium	0.228	mg/kg	8.70E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000034
				Zinc	9.12	mg/kg	3.48E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.12E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0027
			Exp. Route Total								0.E+00					0.2
	Exposure Medium Total										0.E+00					0.2
Medium Total											0.E+00					0.2
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				0.2

TABLE 7.109.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach B	Ingestion													
				Cobalt	0.02	mg/kg	5.73E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.69E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.022
				Copper	3.21	mg/kg	1.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.33E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.033
				Lead	0.24	mg/kg	8.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.89E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	0.20	mg/kg	7.02E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.19E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00058
				Mercury (methyl)	0.20	mg/kg	7.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.18E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.82
				Nickel	0.76	mg/kg	2.69E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.14E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.016
				Selenium	0.77	mg/kg	2.74E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.20E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.064
				Strontium	0.22	mg/kg	7.91E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.22E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00015
				Zinc	11.00	mg/kg	3.92E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.57E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.015
				PCB-1260	0.15	mg/kg	5.41E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	6.32E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	2.60E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	9.E-08	3.03E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								1.E-05					1.0
	Exposure Medium Total										1.E-05					1
Medium Total											1.E-05					1
									Total of Receptor Risks Across All Media		1.E-05		Total of Receptor Hazards Across All Media			1

TABLE 7.110.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach B	Ingestion													
				Barium	0.128	mg/kg	4.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.32E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00027
				Chromium	0.151	mg/kg	5.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.27E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.021
				Cobalt	0.016	mg/kg	5.70E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.65E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.022
				Copper	0.332	mg/kg	1.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0034
				Manganese	0.733	mg/kg	2.61E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.05E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0022
				Mercury (methyl)	0.1056	mg/kg	3.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.39E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.44
				Nickel	0.175	mg/kg	6.23E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.27E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0036
				Selenium	0.879	mg/kg	3.13E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.65E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.073
				Strontium	1.4	mg/kg	4.99E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.82E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00097
				Zinc	13.2	mg/kg	4.70E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.48E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.018
			Exp. Route Total								0.E+00					0.6
	Exposure Medium Total										0.E+00					0.6
Medium Total											0.E+00					0.6
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.6

TABLE 7.111.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Catfish	Catfish	Emory River Reach B	Ingestion													
				Barium	0.10	mg/kg	3.43E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.00E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00020
				Cobalt	0.03	mg/kg	8.98E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.035
				Copper	0.48	mg/kg	1.71E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0050
				Manganese	0.53	mg/kg	1.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.21E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0016
				Mercury (methyl)	0.14	mg/kg	5.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.84E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.58
				Nickel	0.10	mg/kg	3.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.16E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0021
				Selenium	0.40	mg/kg	1.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.68E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.034
				Strontium	0.65	mg/kg	2.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.69E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00045
				Zinc	6.90	mg/kg	2.46E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.87E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0096
				PCB-1254	0.10	mg/kg	3.44E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-06	4.01E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	2.0
				PCB-1260	0.296	mg/kg	1.05E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	1.23E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0135	mg/kg	4.81E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	5.61E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0084	mg/kg	2.99E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	3.49E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0070
				alpha-Chlordane	0.0049	mg/kg	1.75E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-08	2.04E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0041
			Exp. Route Total								3.E-05					2.7
	Exposure Medium Total										3.E-05					3
Medium Total											3.E-05					3
									Total of Receptor Risks Across All Media		3.E-05	Total of Receptor Hazards Across All Media				3

TABLE 7.112.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Crappie	Crappie	Emory River Reach B	Ingestion													
				Copper	2.64	mg/kg	9.40E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.10E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.027
				Mercury (methyl)	0.2208	mg/kg	7.86E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.17E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.92
				Nickel	0.508	mg/kg	1.81E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.11E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.011
				Selenium	0.638	mg/kg	2.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.053
				Strontium	0.228	mg/kg	8.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.47E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00016
				Zinc	9.12	mg/kg	3.25E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.79E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.013
			Exp. Route Total								0.E+00					1.0
	Exposure Medium Total										0.E+00					1.0
Medium Total											0.E+00					1.0
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				1.0

TABLE 7.113.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach C	Ingestion													
				Barium	0.11	mg/kg	4.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.62E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000048
				Chromium	0.14	mg/kg	5.46E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.27E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0042
				Copper	2.91	mg/kg	1.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0065
				Manganese	0.42	mg/kg	1.61E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.75E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00027
				Mercury (methyl)	0.22	mg/kg	8.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.99E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.20
				Nickel	0.26	mg/kg	9.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.27E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0011
				Selenium	0.64	mg/kg	2.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.70E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Strontium	1.96	mg/kg	7.48E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00029
				Zinc	11.60	mg/kg	4.43E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.03E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0034
				PCB-1254	0.21	mg/kg	8.13E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	1.90E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.95
				PCB-1260	0.50	mg/kg	1.90E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-05	4.43E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.03	mg/kg	1.06E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	4.E-07	2.48E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	5.11E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.19E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0024
				alpha-Chlordane	0.01	mg/kg	3.59E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	8.37E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0017
				Heptachlor	0.00	mg/kg	1.53E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	7.E-07	3.56E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00071
			Exp. Route Total								6.E-05					1
	Exposure Medium Total										6.E-05					1
Medium Total											6.E-05					1
							Total of Receptor Risks Across All Media				6.E-05	Total of Receptor Hazards Across All Media				1

TABLE 7.114.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach C	Ingestion													
				Aluminum	7	mg/kg	2.67E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.23E-04	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.00062
				Barium	0.221	mg/kg	8.43E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.97E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000098
				Cobalt	0.0219	mg/kg	8.36E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.95E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0065
				Copper	0.326	mg/kg	1.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.90E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00073
				Iron	12.6	mg/kg	4.81E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0016
				Manganese	2.46	mg/kg	9.39E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.19E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0016
				Mercury (methyl)	0.07328	mg/kg	2.80E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.52E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.065
				Selenium	0.613	mg/kg	2.34E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.46E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Strontium	1.91	mg/kg	7.29E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.70E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00028
				Zinc	14.8	mg/kg	5.65E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.32E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0044
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				0.1

TABLE 7.115.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach C	Ingestion													
				Barium	0.34	mg/kg	1.28E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.99E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00015
				Cobalt	0.04	mg/kg	1.34E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.12E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.010
				Copper	1.04	mg/kg	3.97E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.26E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0023
				Manganese	2.44	mg/kg	9.31E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.17E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0016
				Mercury (methyl)	0.24	mg/kg	8.98E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.09E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.21
				Nickel	0.26	mg/kg	9.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.29E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0011
				Selenium	0.27	mg/kg	1.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0048
				Strontium	2.01	mg/kg	7.67E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.79E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00030
				Zinc	9.00	mg/kg	3.43E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.01E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0027
				PCB-1260	1.12	mg/kg	4.27E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-05	9.97E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0168	mg/kg	6.41E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.50E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0202	mg/kg	7.71E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-07	1.80E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0036
				alpha-Chlordane	0.0031	mg/kg	1.18E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	4.E-08	2.76E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00055
			Exp. Route Total								9.E-05					0.2
	Exposure Medium Total										9.E-05					0.2
Medium Total											9.E-05					0.2
							Total of Receptor Risks Across All Media				9.E-05	Total of Receptor Hazards Across All Media				0.2

TABLE 7.116.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reach C	Ingestion													
				Barium	0.11	mg/kg	3.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.49E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00022
				Chromium	0.14	mg/kg	5.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.94E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.020
				Copper	2.91	mg/kg	1.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.030
				Manganese	0.42	mg/kg	1.50E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0012
				Mercury (methyl)	0.22	mg/kg	7.98E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.31E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.93
				Nickel	0.26	mg/kg	9.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0053
				Selenium	0.64	mg/kg	2.28E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.66E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.053
				Strontium	1.96	mg/kg	6.98E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.14E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0014
				Zinc	11.60	mg/kg	4.13E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.82E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.016
				PCB-1254	0.21	mg/kg	7.59E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	8.85E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	4.4
				PCB-1260	0.50	mg/kg	1.77E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-05	2.07E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.03	mg/kg	9.90E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-07	1.16E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	4.77E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	5.57E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.011
				alpha-Chlordane	0.01	mg/kg	3.35E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	3.91E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0078
				Heptachlor	0.00	mg/kg	1.42E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-07	1.66E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0033
			Exp. Route Total								5.E-05					6
	Exposure Medium Total										5.E-05					6
Medium Total											5.E-05					6
							Total of Receptor Risks Across All Media				5.E-05	Total of Receptor Hazards Across All Media				6

TABLE 7.117.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reach C	Ingestion													
				Aluminum	7	mg/kg	2.49E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.91E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0029
				Barium	0.221	mg/kg	7.87E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.18E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00046
				Cobalt	0.0219	mg/kg	7.80E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.10E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.030
				Copper	0.326	mg/kg	1.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.35E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0034
				Iron	12.6	mg/kg	4.49E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.24E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0075
				Manganese	2.46	mg/kg	8.76E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0073
				Mercury (methyl)	0.07328	mg/kg	2.61E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.04E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.30
				Selenium	0.613	mg/kg	2.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.55E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.051
				Strontium	1.91	mg/kg	6.80E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.94E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0013
				Zinc	14.8	mg/kg	5.27E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.15E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.020
			Exp. Route Total								0.E+00					0.4
	Exposure Medium Total										0.E+00					0.4
Medium Total											0.E+00					0.4
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				0.4

TABLE 7.118.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach C	Ingestion													
				Barium	0.34	mg/kg	1.20E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00070
				Cobalt	0.04	mg/kg	1.25E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-05	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.048
				Copper	1.04	mg/kg	3.70E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.32E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.011
				Manganese	2.44	mg/kg	8.69E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.01E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0072
				Mercury (methyl)	0.24	mg/kg	8.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.77E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.98
				Nickel	0.26	mg/kg	9.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0053
				Selenium	0.27	mg/kg	9.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.023
				Strontium	2.01	mg/kg	7.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.35E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0014
				Zinc	9.00	mg/kg	3.21E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.74E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.012
				PCB-1260	1.12	mg/kg	3.99E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-05	4.65E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.0168	mg/kg	5.98E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	6.98E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0202	mg/kg	7.19E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	8.39E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.017
				alpha-Chlordane	0.0031	mg/kg	1.10E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	4.E-08	1.29E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0026
			Exp. Route Total								8.E-05					1.1
	Exposure Medium Total										8.E-05					1.1
Medium Total											8.E-05					1.1
									Total of Receptor Risks Across All Media		8.E-05	Total of Receptor Hazards Across All Media				1.1

TABLE 7.119.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion													
				Copper	0.35	mg/kg	1.34E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.13E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00078
				Manganese	0.21	mg/kg	7.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.83E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00013
				Mercury (methyl)	0.26	mg/kg	9.83E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.29E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.23
				Selenium	0.50	mg/kg	1.90E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.43E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0089
				Strontium	0.25	mg/kg	9.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.18E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000036
				Zinc	11.10	mg/kg	4.24E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.88E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0033
				PCB-1260	0.11	mg/kg	4.01E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-06	9.35E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								8.E-06					0.2
	Exposure Medium Total										8.E-06					0.2
Medium Total											8.E-06					0.2
									Total of Receptor Risks Across All Media		8.E-06		Total of Receptor Hazards Across All Media			0.2

TABLE 7.120.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reference Reach	Ingestion													
				Aluminum	5.82	mg/kg	2.22E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.18E-04	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.00052
				Barium	0.304	mg/kg	1.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.71E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00014
				Chromium	0.67	mg/kg	2.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.97E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.020
				Copper	0.315	mg/kg	1.20E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.80E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00070
				Manganese	3.57	mg/kg	1.36E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.18E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0023
				Mercury (methyl)	0.12704	mg/kg	4.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.11
				Nickel	0.35	mg/kg	1.34E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.12E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0016
				Selenium	0.602	mg/kg	2.30E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.36E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.011
				Strontium	0.933	mg/kg	3.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.31E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00014
				Zinc	14.4	mg/kg	5.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0043
			Exp. Route Total								0.E+00					0.2
	Exposure Medium Total										0.E+00					0.2
Medium Total											0.E+00					0.2
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.2

TABLE 7.121.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Barium	0.11	mg/kg	4.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	9.53E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000048
				Copper	0.36	mg/kg	1.37E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.21E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00080
				Manganese	0.48	mg/kg	1.84E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.29E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00031
				Mercury (methyl)	0.24	mg/kg	9.10E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.21
				Nickel	0.20	mg/kg	7.56E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.76E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00088
				Selenium	0.26	mg/kg	9.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.30E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0046
				Strontium	0.62	mg/kg	2.36E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.50E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000092
				Zinc	8.36	mg/kg	3.19E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.44E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0025
				PCB-1254	0.14	mg/kg	5.38E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	1.26E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.63
				PCB-1260	0.49	mg/kg	1.89E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-05	4.40E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.02	mg/kg	7.86E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-07	1.83E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0107	mg/kg	4.08E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	9.53E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0019
				alpha-Chlordane	0.0092	mg/kg	3.51E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	8.19E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0016
				gamma-Chlordane	0.0063	mg/kg	2.40E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	8.E-08	5.61E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0011
			Exp. Route Total								5.E-05					0.9
	Exposure Medium Total										5.E-05					0.9
Medium Total											5.E-05					0.9
									Total of Receptor Risks Across All Media		5.E-05		Total of Receptor Hazards Across All Media			0.9

TABLE 7.122.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reference Reach	Ingestion													
				Barium	0.118	mg/kg	4.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000053
				Chromium	0.145	mg/kg	5.53E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0043
				Copper	0.238	mg/kg	9.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00053
				Manganese	0.473	mg/kg	1.80E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.21E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00030
				Mercury (methyl)	0.09824	mg/kg	3.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.75E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.087
				Selenium	0.374	mg/kg	1.43E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.33E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0067
				Strontium	1.694	mg/kg	6.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.51E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00025
				Zinc	20	mg/kg	7.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.78E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0059
			Exp. Route Total								0.E+00					0.11
	Exposure Medium Total										0.E+00					0.11
Medium Total											0.E+00					0.11
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.11

TABLE 7.123.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion													
				Copper	0.35	mg/kg	1.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.46E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0036
				Manganese	0.21	mg/kg	7.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.52E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00061
				Mercury (methyl)	0.26	mg/kg	9.17E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.1
				Selenium	0.50	mg/kg	1.77E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.07E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.041
				Strontium	0.25	mg/kg	8.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00017
				Zinc	11.10	mg/kg	3.95E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.61E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.015
				PCB-1260	0.11	mg/kg	3.74E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	7.E-06	4.36E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
			Exp. Route Total								7.E-06					1.1
	Exposure Medium Total										7.E-06					1.1
Medium Total											7.E-06					1.1
							Total of Receptor Risks Across All Media				7.E-06	Total of Receptor Hazards Across All Media				1.1

TABLE 7.124.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Emory River Reference Reach	Ingestion													
				Aluminum	5.82	mg/kg	2.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.42E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0024
				Barium	0.304	mg/kg	1.08E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00063
				Chromium	0.67	mg/kg	2.39E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.78E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.093
				Copper	0.315	mg/kg	1.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.31E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0033
				Manganese	3.57	mg/kg	1.27E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.48E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.011
				Mercury (methyl)	0.12704	mg/kg	4.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.53
				Nickel	0.35	mg/kg	1.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.45E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0073
				Selenium	0.602	mg/kg	2.14E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.50E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.050
				Strontium	0.933	mg/kg	3.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.88E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00065
				Zinc	14.4	mg/kg	5.13E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.98E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.020
			Exp. Route Total								0.E+00					0.7
	Exposure Medium Total										0.E+00					0.7
Medium Total											0.E+00					0.7
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				0.7

TABLE 7.125.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Barium	0.11	mg/kg	3.81E-06	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	4.45E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00022
				Copper	0.36	mg/kg	1.28E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.50E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0037
				Manganese	0.48	mg/kg	1.72E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0014
				Mercury (methyl)	0.24	mg/kg	8.49E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.91E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.99
				Nickel	0.20	mg/kg	7.05E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.23E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0041
				Selenium	0.26	mg/kg	9.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.021
				Strontium	0.62	mg/kg	2.20E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.57E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00043
				Zinc	8.36	mg/kg	2.98E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.47E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.012
				PCB-1254	0.14	mg/kg	5.02E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	5.86E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	2.9
				PCB-1260	0.49	mg/kg	1.76E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	4.E-05	2.05E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.02	mg/kg	7.34E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	8.56E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.0107	mg/kg	3.81E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	4.45E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0089
				alpha-Chlordane	0.0092	mg/kg	3.28E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	3.82E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0076
				gamma-Chlordane	0.0063	mg/kg	2.24E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	8.E-08	2.62E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0052
			Exp. Route Total								5.E-05					4
	Exposure Medium Total										5.E-05					4
Medium Total											5.E-05					4
									Total of Receptor Risks Across All Media		5.E-05		Total of Receptor Hazards Across All Media			4

TABLE 7.126.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Emory River Reference Reach	Ingestion													
				Barium	0.118	mg/kg	4.20E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.90E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00025
				Chromium	0.145	mg/kg	5.16E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.03E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.020
				Copper	0.238	mg/kg	8.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.89E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0025
				Manganese	0.473	mg/kg	1.68E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.97E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0014
				Mercury (methyl)	0.09824	mg/kg	3.50E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.41
				Selenium	0.374	mg/kg	1.33E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.55E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.031
				Strontium	1.694	mg/kg	6.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.04E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0012
				Zinc	20	mg/kg	7.12E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.31E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.028
			Exp. Route Total								0.E+00					0.5
	Exposure Medium Total										0.E+00					0.5
Medium Total											0.E+00					0.5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.5

TABLE 7.127.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Little Emory River	Ingestion													
				Barium	0.04	mg/kg	1.53E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000018
				Copper	0.33	mg/kg	1.26E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.95E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00074
				Manganese	0.13	mg/kg	4.85E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.13E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.000081
				Mercury (methyl)	0.12	mg/kg	4.64E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.08E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.11
				Nickel	0.47	mg/kg	1.80E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.19E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0021
				Selenium	0.54	mg/kg	2.08E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.84E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0097
				Strontium	0.33	mg/kg	1.25E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.92E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000049
				Zinc	6.89	mg/kg	2.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.13E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0020
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				0.1

TABLE 7.128.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Little Emory River	Ingestion													
				Aluminum	4.14	mg/kg	1.58E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.69E-04	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.00037
				Barium	0.0545	mg/kg	2.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.85E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000024
				Chromium	0.154	mg/kg	5.88E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0046
				Copper	0.297	mg/kg	1.13E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.64E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00066
				Manganese	1.08	mg/kg	4.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.62E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00069
				Mercury (methyl)	0.09312	mg/kg	3.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.29E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.083
				Selenium	0.646	mg/kg	2.47E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.75E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.012
				Strontium	0.794	mg/kg	3.03E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.07E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00012
				Zinc	16.1	mg/kg	6.14E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.43E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0048
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
							Total of Receptor Risks Across All Media				0.E+00	Total of Receptor Hazards Across All Media				0.1

TABLE 7.129.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Little Emory River	Ingestion	Copper	0.72	mg/kg	2.75E-05	mg/kg-day	No toxicity value	$(mg/kg\text{-}day)^{-1}$	NA	6.42E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0016
				Manganese	0.21	mg/kg	7.98E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.86E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00013
				Mercury (methyl)	0.16	mg/kg	6.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.42E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.14
				Selenium	0.33	mg/kg	1.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.90E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0058
				Strontium	0.06	mg/kg	2.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.48E-06	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0000091
				Zinc	7.03	mg/kg	2.68E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.26E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0021
			Exp. Route Total								0.E+00					0.2
	Exposure Medium Total										0.E+00					0.2
Medium Total											0.E+00					0.2
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.2

TABLE 7.130.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Little Emory River	Ingestion													
				Barium	0.0915	mg/kg	3.49E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.15E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000041
				Chromium	0.238	mg/kg	9.08E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0071
				Copper	0.18	mg/kg	6.87E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00040
				Manganese	0.231	mg/kg	8.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.06E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00015
				Mercury (methyl)	0.12912	mg/kg	4.93E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.15E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.11
				Nickel	0.158	mg/kg	6.03E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.41E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00070
				Selenium	0.466	0E+00	1.78E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.15E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0083
				Strontium	0.331	0E+00	1.26E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.95E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000049
				Zinc	7.45	0E+00	2.84E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.63E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0022
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.1

TABLE 7.131.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Little Emory River	Ingestion													
				Barium	0.04	mg/kg	1.43E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.67E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000083
				Copper	0.33	mg/kg	1.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0034
				Manganese	0.13	mg/kg	4.52E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.28E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00038
				Mercury (methyl)	0.12	mg/kg	4.33E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.05E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.51
				Nickel	0.47	mg/kg	1.68E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.96E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0098
				Selenium	0.54	mg/kg	1.94E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.26E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.045
				Strontium	0.33	mg/kg	1.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.36E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00023
				Zinc	6.89	mg/kg	2.45E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.86E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0095
			Exp. Route Total								0.E+00					0.6
	Exposure Medium Total										0.E+00					0.6
Medium Total											0.E+00					0.6
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				0.6

TABLE 7.132.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Little Emory River	Ingestion													
				Aluminum	4.14	mg/kg	1.47E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-03	mg/kg-day	1.0E+00	1/(mg/kg-day)	0.0017
				Barium	0.0545	mg/kg	1.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.26E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00011
				Chromium	0.154	mg/kg	5.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.40E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.021
				Copper	0.297	mg/kg	1.06E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.23E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0031
				Manganese	1.08	mg/kg	3.85E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.49E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0032
				Mercury (methyl)	0.09312	mg/kg	3.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.87E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.39
				Selenium	0.646	mg/kg	2.30E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.68E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.054
				Strontium	0.794	mg/kg	2.83E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.30E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00055
				Zinc	16.1	mg/kg	5.73E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.69E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
			Exp. Route Total								0.E+00					0.5
	Exposure Medium Total										0.E+00					0.5
Medium Total											0.E+00					0.5
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				0.5

TABLE 7.133.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Little Emory River	Ingestion	Copper	0.72	mg/kg	2.57E-05	mg/kg-day	No toxicity value	(mg/kg-day)$^{-1}$	NA	3.00E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0075
				Manganese	0.21	mg/kg	7.44E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.68E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00062
				Mercury (methyl)	0.16	mg/kg	5.70E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.65E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.66
				Selenium	0.33	mg/kg	1.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.35E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.027
				Strontium	0.06	mg/kg	2.19E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.56E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000043
				Zinc	7.03	mg/kg	2.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.92E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0097
			Exp. Route Total								0.E+00					0.7
	Exposure Medium Total										0.E+00					0.7
Medium Total											0.E+00					0.7
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.7

TABLE 7.134.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Little Emory River	Ingestion													
				Barium	0.0915	mg/kg	3.26E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.80E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00019
				Chromium	0.238	mg/kg	8.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.89E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.033
				Copper	0.18	mg/kg	6.41E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.48E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0019
				Manganese	0.231	mg/kg	8.23E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.60E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00069
				Mercury (methyl)	0.12912	mg/kg	4.60E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.37E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.54
				Nickel	0.158	mg/kg	5.63E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.57E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0033
				Selenium	0.466	mg/kg	1.66E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.039
				Strontium	0.331	mg/kg	1.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00023
				Zinc	7.45	mg/kg	2.65E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.10E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.010
			Exp. Route Total								0.E+00					0.6
	Exposure Medium Total										0.E+00					0.6
Medium Total											0.E+00					0.6
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.6

TABLE 7.135.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion													
				Copper	0.44	mg/kg	1.69E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.94E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00099
				Manganese	0.22	mg/kg	8.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.99E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00014
				Mercury (methyl)	0.29	mg/kg	1.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.62E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.26
				Nickel	0.13	mg/kg	5.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.19E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00060
				Selenium	0.72	mg/kg	2.74E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.39E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.013
				Strontium	0.33	mg/kg	1.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.97E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000050
				Zinc	13.20	mg/kg	5.04E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.18E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0039
				PCB-1254	0.08	mg/kg	3.18E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-06	7.42E-06	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.37
				PCB-1260	0.23	mg/kg	8.93E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	2.08E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.02	mg/kg	6.87E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.60E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	1.91E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	6.E-08	4.45E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00089
			Exp. Route Total								2.E-05					0.7
	Exposure Medium Total										2.E-05					0.7
Medium Total											2.E-05					0.7
									Total of Receptor Risks Across All Media		2.E-05			Total of Receptor Hazards Across All Media		0.7

TABLE 7.136.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reach A	Ingestion													
				Barium	0.086	mg/kg	3.28E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.66E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000038
				Cobalt	0.0154	mg/kg	5.88E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0046
				Copper	0.281	mg/kg	1.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.50E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00063
				Manganese	0.503	mg/kg	1.92E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.48E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00032
				Mercury (methyl)	0.10464	mg/kg	3.99E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.32E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.093
				Selenium	1.17	mg/kg	4.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.021
				Silver	0.00455	mg/kg	1.74E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.05E-07	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.000081
				Strontium	0.624	mg/kg	2.38E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.56E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000093
				Zinc	16.9	mg/kg	6.45E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.50E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0050
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
									Total of Receptor Risks Across All Media		0.E+00			Total of Receptor Hazards Across All Media		0.1

TABLE 7.137.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Arsenic	0.002	mg/kg	7.63E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.E-07	1.78E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00059
				Barium	0.06	mg/kg	2.46E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.74E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000029
				Chromium	0.20	mg/kg	7.59E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.77E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0059
				Copper	3.68	mg/kg	1.40E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.28E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0082
				Lead	0.31	mg/kg	1.18E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.75E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	0.41	mg/kg	1.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.61E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00026
				Mercury (methyl)	0.15	mg/kg	5.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.34E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.13
				Nickel	0.25	mg/kg	9.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.18E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0011
				Selenium	0.49	mg/kg	1.88E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.39E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0088
				Strontium	0.41	mg/kg	1.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.68E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000061
				Zinc	7.39	mg/kg	2.82E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.58E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0022
				PCB-1254	0.11	mg/kg	4.16E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-06	9.71E-06	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.49
				PCB-1260	0.23	mg/kg	8.66E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	2.02E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	5.50E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.28E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	2.44E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-08	5.70E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0011
				alpha-Chlordane	0.01	mg/kg	3.40E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	7.92E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0016
				gamma-Chlordane	0.00	mg/kg	1.18E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	4.E-08	2.76E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00055
			Exp. Route Total								3.E-05					0.6
	Exposure Medium Total										3.E-05					0.6
Medium Total											3.E-05					0.6
									Total of Receptor Risks Across All Media		3.E-05		Total of Receptor Hazards Across All Media			0.6

TABLE 7.138.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reach A	Ingestion													
				Chromium	0.12	mg/kg	4.58E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.07E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0036
				Copper	0.364	mg/kg	1.39E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.24E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00081
				Manganese	0.207	mg/kg	7.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.84E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00013
				Mercury (methyl)	0.07664	mg/kg	2.92E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.82E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.068
				Nickel	0.113	mg/kg	4.31E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.01E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00050
				Selenium	0.298	mg/kg	1.14E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.65E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0053
				Strontium	0.126	mg/kg	4.81E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.12E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000019
				Zinc	8.04	mg/kg	3.07E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.16E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0024
			Exp. Route Total								0.E+00					0.08
	Exposure Medium Total										0.E+00					0.08
Medium Total											0.E+00					0.08
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.08

TABLE 7.139.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Clinch River Reach A	Ingestion													
				Copper	0.44	mg/kg	1.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.84E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0046
				Manganese	0.22	mg/kg	7.98E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.31E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00066
				Mercury (methyl)	0.29	mg/kg	1.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.22E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.2
				Nickel	0.13	mg/kg	4.77E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.57E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0028
				Selenium	0.72	mg/kg	2.56E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.98E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.060
				Strontium	0.33	mg/kg	1.19E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.39E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00023
				Zinc	13.20	mg/kg	4.70E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.48E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.018
				PCB-1254	0.08	mg/kg	2.97E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-06	3.46E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	1.7
				PCB-1260	0.23	mg/kg	8.33E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	9.72E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.02	mg/kg	6.41E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	7.48E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	1.78E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	6.E-08	2.08E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0042
			Exp. Route Total								2.E-05					3
	Exposure Medium Total										2.E-05					3
Medium Total											2.E-05					3
									Total of Receptor Risks Across All Media		2.E-05		Total of Receptor Hazards Across All Media			3

TABLE 7.140.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Clinch River Reach A	Ingestion													
				Barium	0.086	mg/kg	3.06E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.57E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00018
				Cobalt	0.0154	mg/kg	5.48E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.40E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.021
				Copper	0.281	mg/kg	1.00E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.17E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0029
				Manganese	0.503	mg/kg	1.79E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.09E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0015
				Mercury (methyl)	0.10464	mg/kg	3.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.35E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.43
				Selenium	1.17	mg/kg	4.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.86E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.097
				Silver	0.00455	mg/kg	1.62E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.89E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00038
				Strontium	0.624	mg/kg	2.22E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.59E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00043
				Zinc	16.9	mg/kg	6.02E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.02E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.023
			Exp. Route Total								0.E+00					0.6
	Exposure Medium Total										0.E+00					0.6
Medium Total											0.E+00					0.6
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.6

TABLE 7.141.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Arsenic	0.002	mg/kg	7.12E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	1.E-07	8.31E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0028
				Barium	0.06	mg/kg	2.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.68E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00013
				Chromium	0.20	mg/kg	7.09E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.27E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.028
				Copper	3.68	mg/kg	1.31E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.53E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.038
				Lead	0.31	mg/kg	1.10E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.28E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	0.41	mg/kg	1.44E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.68E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0012
				Mercury (methyl)	0.15	mg/kg	5.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.24E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.62
				Nickel	0.25	mg/kg	8.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.02E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0051
				Selenium	0.49	mg/kg	1.76E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.05E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.041
				Strontium	0.41	mg/kg	1.47E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00029
				Zinc	7.39	mg/kg	2.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.07E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.010
				PCB-1254	0.11	mg/kg	3.88E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	8.E-06	4.53E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	2.3
				PCB-1260	0.23	mg/kg	8.08E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	2.E-05	9.43E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	5.13E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	5.98E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	2.28E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	8.E-08	2.66E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0053
				alpha-Chlordane	0.01	mg/kg	3.17E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	3.70E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0074
				gamma-Chlordane	0.00	mg/kg	1.10E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	4.E-08	1.29E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0026
			Exp. Route Total								2.E-05					3
	Exposure Medium Total										2.E-05					3
Medium Total											2.E-05					3
									Total of Receptor Risks Across All Media		2.E-05	Total of Receptor Hazards Across All Media				3

TABLE 7.142.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reach A	Ingestion													
				Chromium	0.12	mg/kg	4.27E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.99E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.017
				Copper	0.364	mg/kg	1.30E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.51E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0038
				Manganese	0.207	mg/kg	7.37E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.60E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00061
				Mercury (methyl)	0.07664	mg/kg	2.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.18E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.32
				Nickel	0.113	mg/kg	4.02E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.70E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0023
				Selenium	0.298	mg/kg	1.06E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.24E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.025
				Strontium	0.126	mg/kg	4.49E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.24E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000087
				Zinc	8.04	mg/kg	2.86E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.34E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.011
			Exp. Route Total								0.E+00					0.4
	Exposure Medium Total										0.E+00					0.4
Medium Total											0.E+00					0.4
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				0.4

TABLE 7.143.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reach B	Ingestion													
				Barium	0.59	mg/kg	2.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.23E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00026
				Cobalt	0.02	mg/kg	6.72E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.57E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0052
				Copper	4.51	mg/kg	1.72E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.02E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.010
				Iron	17.58	mg/kg	6.71E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.57E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.0022
				Lead	0.21	mg/kg	8.01E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.87E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	0.86	mg/kg	3.29E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.68E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00055
				Mercury (methyl)	0.17	mg/kg	6.59E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.54E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.15
				Nickel	0.51	mg/kg	1.95E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.54E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0023
				Selenium	0.71	mg/kg	2.72E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.34E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.013
				Strontium	4.88	mg/kg	1.86E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.35E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00072
				Zinc	12.20	mg/kg	4.66E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0036
				PCB-1254	0.13	mg/kg	4.85E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	1.13E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.57
				PCB-1260	0.38	mg/kg	1.46E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-05	3.41E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.02	mg/kg	8.28E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-07	1.93E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	5.00E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.17E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0023
				alpha-Chlordane	0.01	mg/kg	2.14E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-08	4.99E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00100
				Heptachlor	0.00	mg/kg	1.30E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-07	3.03E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00061
			Exp. Route Total								4.E-05					0.8
	Exposure Medium Total										4.E-05					0.8
Medium Total											4.E-05					0.8
									Total of Receptor Risks Across All Media		4.E-05		Total of Receptor Hazards Across All Media			0.8

TABLE 7.144.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reach B	Ingestion													
				Barium	0.384	mg/kg	1.47E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.42E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00017
				Copper	0.25	mg/kg	9.54E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.23E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00056
				Manganese	1.664	mg/kg	6.35E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.48E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0011
				Mercury (methyl)	0.0888	mg/kg	3.39E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.91E-06	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.079
				Molybdenum	0.047	mg/kg	1.79E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.18E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.00084
				Selenium	1.06	mg/kg	4.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.44E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.019
				Strontium	4.58	mg/kg	1.75E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.08E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00068
				Vanadium	0.0715	mg/kg	2.73E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.37E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0013
				Zinc	14.5	mg/kg	5.53E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.29E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0043
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.1

TABLE 7.145.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach B	Ingestion													
				Barium	0.07	mg/kg	2.51E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.87E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000029
				Cobalt	0.02	mg/kg	7.36E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0057
				Copper	1.31	mg/kg	5.00E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.17E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0029
				Manganese	0.65	mg/kg	2.48E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.80E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00041
				Mercury (methyl)	0.33	mg/kg	1.26E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.93E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.29
				Selenium	0.33	mg/kg	1.27E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.97E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0059
				Strontium	0.61	mg/kg	2.33E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.43E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000091
				Zinc	8.74	mg/kg	3.34E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.78E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0026
				PCB-1260	0.76	mg/kg	2.89E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	6.E-05	6.74E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.03	mg/kg	1.29E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	4.E-07	3.01E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.02	mg/kg	6.26E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.46E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0029
				alpha-Chlordane	0.00	mg/kg	1.76E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-08	4.10E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00082
			Exp. Route Total								6.E-05					0.3
	Exposure Medium Total										6.E-05					0.3
Medium Total											6.E-05					0.3
									Total of Receptor Risks Across All Media		6.E-05		Total of Receptor Hazards Across All Media			0.3

TABLE 7.146.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reach B	Ingestion													
				Barium	0.59	mg/kg	2.09E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.44E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0012
				Cobalt	0.02	mg/kg	6.27E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.31E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.024
				Copper	4.51	mg/kg	1.61E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.87E-03	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.047
				Iron	17.58	mg/kg	6.26E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.30E-03	mg/kg-day	7.0E-01	1/(mg/kg-day)	0.010
				Lead	0.21	mg/kg	7.48E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.73E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				Manganese	0.86	mg/kg	3.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.59E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0026
				Mercury (methyl)	0.17	mg/kg	6.15E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.18E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.72
				Nickel	0.51	mg/kg	1.82E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.12E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.011
				Selenium	0.71	mg/kg	2.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.96E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.059
				Strontium	4.88	mg/kg	1.74E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.03E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0034
				Zinc	12.20	mg/kg	4.35E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.07E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.017
				PCB-1254	0.13	mg/kg	4.52E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	9.E-06	5.28E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	2.6
				PCB-1260	0.38	mg/kg	1.36E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-05	1.59E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.02	mg/kg	7.73E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-07	9.02E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	4.67E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	5.44E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.011
				alpha-Chlordane	0.01	mg/kg	1.99E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-08	2.33E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0047
				Heptachlor	0.00	mg/kg	1.21E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	5.E-07	1.41E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0028
			Exp. Route Total								4.E-05					4
	Exposure Medium Total										4.E-05					4
Medium Total											4.E-05					4
									Total of Receptor Risks Across All Media		4.E-05		Total of Receptor Hazards Across All Media			4

TABLE 7.147.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reach B	Ingestion													
				Barium	0.384	mg/kg	1.37E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.60E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00080
				Copper	0.25	mg/kg	8.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0026
				Manganese	1.664	mg/kg	5.93E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.91E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0049
				Mercury (methyl)	0.0888	mg/kg	3.16E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.69E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.37
				Molybdenum	0.047	mg/kg	1.67E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.95E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0039
				Selenium	1.06	mg/kg	3.78E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.40E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.088
				Strontium	4.58	mg/kg	1.63E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.90E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0032
				Vanadium	0.0715	mg/kg	2.55E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.97E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0059
				Zinc	14.5	mg/kg	5.16E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.03E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.020
			Exp. Route Total								0.E+00					0.5
	Exposure Medium Total										0.E+00					0.5
Medium Total											0.E+00					0.5
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.5

TABLE 7.148.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach B	Ingestion													
				Barium	0.07	mg/kg	2.35E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.74E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00014
				Cobalt	0.02	mg/kg	6.87E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.02E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.027
				Copper	1.31	mg/kg	4.67E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.44E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.014
				Manganese	0.65	mg/kg	2.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.71E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0019
				Mercury (methyl)	0.33	mg/kg	1.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.37E-04	mg/kg-day	1.0E-04	1/(mg/kg-day)	1.4
				Selenium	0.33	mg/kg	1.19E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.38E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.028
				Strontium	0.61	mg/kg	2.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.53E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00042
				Zinc	8.74	mg/kg	3.11E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.63E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.012
				PCB-1260	0.76	mg/kg	2.70E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-05	3.15E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.03	mg/kg	1.20E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	4.E-07	1.40E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.02	mg/kg	5.84E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	6.81E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.014
				alpha-Chlordane	0.00	mg/kg	1.64E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	6.E-08	1.91E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0038
			Exp. Route Total								5.E-05					1.5
	Exposure Medium Total										5.E-05					1.5
Medium Total											5.E-05					1.5
									Total of Receptor Risks Across All Media		5.E-05		Total of Receptor Hazards Across All Media			1.5

TABLE 7.149.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reference Reach	Ingestion													
				Chromium	0.25	mg/kg	9.58E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.23E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0074
				Cobalt	0.01	mg/kg	5.19E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.21E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0040
				Copper	0.37	mg/kg	1.41E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.29E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00082
				Manganese	0.22	mg/kg	8.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00014
				Mercury (methyl)	0.22	mg/kg	8.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.94E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.19
				Nickel	0.12	mg/kg	4.69E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.10E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00055
				Selenium	0.58	mg/kg	2.22E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.17E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.010
				Strontium	0.35	mg/kg	1.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.09E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.000051
				Vanadium	0.08	mg/kg	3.11E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.26E-06	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0015
				Zinc	11.80	mg/kg	4.50E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.05E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0035
				PCB-1254	0.07	mg/kg	2.63E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-06	6.14E-06	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.31
				PCB-1260	0.19	mg/kg	7.33E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	1.71E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	3.17E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	7.39E-07	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-Chlordane	0.01	mg/kg	2.06E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-08	4.81E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00096
				Heptachlor	0.00	mg/kg	1.37E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-07	3.21E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00064
			Exp. Route Total								2.E-05					0.5
	Exposure Medium Total										2.E-05					0.5
Medium Total											2.E-05					0.5
									Total of Receptor Risks Across All Media		2.E-05		Total of Receptor Hazards Across All Media			0.5

TABLE 7.150.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sunfish	Sunfish	Clinch River Reference Reach	Ingestion													
				Barium	0.153	mg/kg	5.84E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.36E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000068
				Boron	0.482	mg/kg	1.84E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.29E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00021
				Chromium	0.316	mg/kg	1.21E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.81E-05	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.0094
				Copper	0.256	mg/kg	9.77E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.28E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00057
				Manganese	3.65	mg/kg	1.39E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.25E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0023
				Mercury (methyl)	0.12256	mg/kg	4.68E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.09E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.11
				Nickel	0.141	mg/kg	5.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.26E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.00063
				Selenium	0.676	mg/kg	2.58E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.02E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.012
				Strontium	2.4	mg/kg	9.16E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.14E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00036
				Zinc	15.7	mg/kg	5.99E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.40E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0047
			Exp. Route Total								0.E+00					0.1
	Exposure Medium Total										0.E+00					0.1
Medium Total											0.E+00					0.1
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.1

TABLE 7.151.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reference Reach	Ingestion	Arsenic	0.001	mg/kg	3.82E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-08	8.90E-08	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.00030
				Barium	0.21	mg/kg	7.86E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.83E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000092
				Cadmium	0.02	mg/kg	7.48E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.75E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0035
				Cobalt	0.02	mg/kg	8.36E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.95E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0065
				Copper	1.75	mg/kg	6.68E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.56E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0039
				Manganese	1.17	mg/kg	4.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00074
				Mercury (methyl)	0.19	mg/kg	7.39E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.72E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.17
				Nickel	0.27	mg/kg	1.05E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.44E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0012
				Selenium	0.29	mg/kg	1.12E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.61E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0052
				Strontium	4.54	mg/kg	1.73E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.04E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00067
				Zinc	8.21	mg/kg	3.13E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.31E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0024
				PCB-1254	0.19	mg/kg	7.21E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	1.68E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	0.84
				PCB-1260	0.44	mg/kg	1.68E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-05	3.93E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.03	mg/kg	1.10E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	4.E-07	2.56E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	4.88E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	1.14E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0023
				alpha-Chlordane	0.01	mg/kg	5.34E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	2.E-07	1.25E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0025
				gamma-Chlordane	0.01	mg/kg	3.21E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	7.48E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0015
				Heptachlor	0.00	mg/kg	1.34E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-07	3.12E-07	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.00062
			Exp. Route Total								5.E-05					1.0
	Exposure Medium Total										5.E-05					1.0
Medium Total											5.E-05					1.0
									Total of Receptor Risks Across All Media		5.E-05		Total of Receptor Hazards Across All Media			1.0

TABLE 7.152.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reference Reach	Ingestion													
				Barium	0.054	mg/kg	2.06E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.81E-06	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.000024
				Copper	0.205	mg/kg	7.82E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.83E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.00046
				Manganese	0.432	mg/kg	1.65E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.85E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00027
				Mercury (methyl)	0.2336	mg/kg	8.91E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.08E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.21
				Selenium	0.399	mg/kg	1.52E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.55E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0071
				Strontium	0.907	mg/kg	3.46E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.08E-05	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00013
				Zinc	6.825	mg/kg	2.60E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.08E-04	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0020
			Exp. Route Total								0.E+00					0.2
	Exposure Medium Total										0.E+00					0.2
Medium Total											0.E+00					0.2
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			0.2

TABLE 7.153.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Bass	Bass	Clinch River Reference Reach	Ingestion													
				Chromium	0.25	mg/kg	8.94E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.04E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.035
				Cobalt	0.01	mg/kg	4.84E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.65E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.019
				Copper	0.37	mg/kg	1.32E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.54E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0038
				Manganese	0.22	mg/kg	7.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.06E-05	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.00065
				Mercury (methyl)	0.22	mg/kg	7.75E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.04E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.90
				Nickel	0.12	mg/kg	4.38E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.11E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0026
				Selenium	0.58	mg/kg	2.07E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.41E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.048
				Strontium	0.35	mg/kg	1.24E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.44E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00024
				Vanadium	0.08	mg/kg	2.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.39E-05	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.0068
				Zinc	11.80	mg/kg	4.20E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.90E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.016
				PCB-1254	0.07	mg/kg	2.46E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	5.E-06	2.87E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	1.4
				PCB-1260	0.19	mg/kg	6.84E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	7.98E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.01	mg/kg	2.96E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	1.E-07	3.45E-06	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				alpha-Chlordane	0.01	mg/kg	1.92E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	7.E-08	2.24E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0045
				Heptachlor	0.00	mg/kg	1.28E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-07	1.50E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0030
			Exp. Route Total								2.E-05					2
	Exposure Medium Total										2.E-05					2
Medium Total											2.E-05					2
									Total of Receptor Risks Across All Media		2.E-05	Total of Receptor Hazards Across All Media				2

TABLE 7.154.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Sunfish	Sunfish	Clinch River Reference Reach	Ingestion													
				Barium	0.153	mg/kg	5.45E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.36E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00032
				Boron	0.482	mg/kg	1.72E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.00E-04	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.0010
				Chromium	0.316	mg/kg	1.13E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.31E-04	mg/kg-day	3.0E-03	1/(mg/kg-day)	0.044
				Copper	0.256	mg/kg	9.12E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.06E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0027
				Manganese	3.65	mg/kg	1.30E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.52E-03	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.011
				Mercury (methyl)	0.12256	mg/kg	4.37E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.09E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.51
				Nickel	0.141	mg/kg	5.02E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	5.86E-05	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0029
				Selenium	0.676	mg/kg	2.41E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.81E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.056
				Strontium	2.4	mg/kg	8.55E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.97E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0017
				Zinc	15.7	mg/kg	5.59E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	6.52E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.022
			Exp. Route Total								0.E+00					0.7
	Exposure Medium Total										0.E+00					0.7
Medium Total											0.E+00					0.7
									Total of Receptor Risks Across All Media		0.E+00	Total of Receptor Hazards Across All Media				0.7

TABLE 7.155.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reference Reach	Ingestion	Arsenic	0.001	mg/kg	3.56E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	5.E-08	4.16E-07	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.0014
				Barium	0.21	mg/kg	7.34E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.56E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00043
				Cadmium	0.02	mg/kg	6.98E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.14E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.016
				Cobalt	0.02	mg/kg	7.80E-07	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.10E-06	mg/kg-day	3.0E-04	1/(mg/kg-day)	0.030
				Copper	1.75	mg/kg	6.23E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	7.27E-04	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.018
				Manganese	1.17	mg/kg	4.17E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	4.86E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0035
				Mercury (methyl)	0.19	mg/kg	6.90E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.04E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.80
				Nickel	0.27	mg/kg	9.76E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.14E-04	mg/kg-day	2.0E-02	1/(mg/kg-day)	0.0057
				Selenium	0.29	mg/kg	1.04E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.22E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.024
				Strontium	4.54	mg/kg	1.62E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.88E-03	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.0031
				Zinc	8.21	mg/kg	2.92E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.41E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.011
				PCB-1254	0.19	mg/kg	6.73E-06	mg/kg-day	2.0E+00	(mg/kg-day)-1	1.E-05	7.85E-05	mg/kg-day	2.0E-05	1/(mg/kg-day)	3.9
				PCB-1260	0.44	mg/kg	1.57E-05	mg/kg-day	2.0E+00	(mg/kg-day)-1	3.E-05	1.83E-04	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDE	0.03	mg/kg	1.03E-06	mg/kg-day	3.4E-01	(mg/kg-day)-1	3.E-07	1.20E-05	mg/kg-day	No toxicity value	1/(mg/kg-day)	NA
				4,4'-DDT	0.01	mg/kg	4.56E-07	mg/kg-day	3.4E-01	(mg/kg-day)-1	2.E-07	5.32E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.011
				alpha-Chlordane	0.01	mg/kg	4.99E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	2.E-07	5.82E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.012
				gamma-Chlordane	0.01	mg/kg	2.99E-07	mg/kg-day	3.5E-01	(mg/kg-day)-1	1.E-07	3.49E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0070
				Heptachlor	0.00	mg/kg	1.25E-07	mg/kg-day	4.5E+00	(mg/kg-day)-1	6.E-07	1.45E-06	mg/kg-day	5.0E-04	1/(mg/kg-day)	0.0029
			Exp. Route Total								5.E-05					5
	Exposure Medium Total										5.E-05					5
Medium Total											5.E-05					5
									Total of Receptor Risks Across All Media		5.E-05		Total of Receptor Hazards Across All Media			5

TABLE 7.156.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Crappie	Crappie	Clinch River Reference Reach	Ingestion													
				Barium	0.054	mg/kg	1.92E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.24E-05	mg/kg-day	2.0E-01	1/(mg/kg-day)	0.00011
				Copper	0.205	mg/kg	7.30E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	8.52E-05	mg/kg-day	4.0E-02	1/(mg/kg-day)	0.0021
				Manganese	0.432	mg/kg	1.54E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.80E-04	mg/kg-day	1.4E-01	1/(mg/kg-day)	0.0013
				Mercury (methyl)	0.2336	mg/kg	8.32E-06	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	9.71E-05	mg/kg-day	1.0E-04	1/(mg/kg-day)	0.97
				Selenium	0.399	mg/kg	1.42E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	1.66E-04	mg/kg-day	5.0E-03	1/(mg/kg-day)	0.033
				Strontium	0.907	mg/kg	3.23E-05	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	3.77E-04	mg/kg-day	6.0E-01	1/(mg/kg-day)	0.00063
				Zinc	6.825	mg/kg	2.43E-04	mg/kg-day	No toxicity value	(mg/kg-day)-1	NA	2.84E-03	mg/kg-day	3.0E-01	1/(mg/kg-day)	0.0095
			Exp. Route Total								0.E+00					1.0
	Exposure Medium Total										0.E+00					1.0
Medium Total											0.E+00					1.0
									Total of Receptor Risks Across All Media		0.E+00		Total of Receptor Hazards Across All Media			1.0

TABLE 8.1.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach A	Ingestion	Radium-226	0.88	pCi/L	US EPA RAGS Part A	1.48E+04	pCi	7.30E-10	risk/pCi	1.E-05
				Uranium-234	0.265	pCi/L	US EPA RAGS Part A	4.45E+03	pCi	1.58E-10	risk/pCi	7.E-07
				Uranium-238	0.171	pCi/L	US EPA RAGS Part A	2.87E+03	pCi	2.10E-10	risk/pCi	6.E-07
			Exp. Route Total									1.E-05
		Exposure Point Total										1.E-05
	Exposure Medium Total											1.E-05
Medium Total												1.E-05

Total of Receptor Risks Across All Media 1.E-05

TABLE 8.2.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach A	Ingestion	Radium-226	0.88	pCi/L	US EPA RAGS Part A	1.85E+03	pCi	7.30E-10	risk/pCi	1.E-06
				Uranium-234	0.265	pCi/L	US EPA RAGS Part A	5.57E+02	pCi	1.58E-10	risk/pCi	9.E-08
				Uranium-238	0.171	pCi/L	US EPA RAGS Part A	3.59E+02	pCi	2.10E-10	risk/pCi	8.E-08
			Exp. Route Total									2.E-06
Medium Total												2.E-06

Total of Receptor Risks Across All Media 2.E-06

TABLE 8.3.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach A	Ingestion	Cesium-137	0.406	pCi/g	US EPA RAGS Part A	4.38E+01	pCi	4.33E-11	risk/pCi	2.E-09
				Potassium-40	23.3	pCi/g	US EPA RAGS Part A	2.52E+03	pCi	6.18E-11	risk/pCi	2.E-07
				Radium-226	1.08	pCi/g	US EPA RAGS Part A	1.17E+02	pCi	7.30E-10	risk/pCi	9.E-08
				Radium-228	1.68	pCi/g	US EPA RAGS Part A	1.81E+02	pCi	2.29E-09	risk/pCi	4.E-07
				Thorium-228	1.8	pCi/g	US EPA RAGS Part A	1.94E+02	pCi	2.89E-10	risk/pCi	6.E-08
				Thorium-230	1.55	pCi/g	US EPA RAGS Part A	1.67E+02	pCi	2.02E-10	risk/pCi	3.E-08
				Thorium-232	1.61	pCi/g	US EPA RAGS Part A	1.74E+02	pCi	2.31E-10	risk/pCi	4.E-08
				Thorium-234	0.981	pCi/g	US EPA RAGS Part A	1.06E+02	pCi	6.70E-11	risk/pCi	7.E-09
				Uranium-234	1.31	pCi/g	US EPA RAGS Part A	1.41E+02	pCi	1.58E-10	risk/pCi	2.E-08
				Uranium-238	1.26	pCi/g	US EPA RAGS Part A	1.36E+02	pCi	2.10E-10	risk/pCi	3.E-08
			Exp. Route Total									8.E-07
			External Exposure	Cesium-137	0.406	pCi/g	US EPA RAGS Part A	6.76E-02	pCi	2.54E-06	risk/yr per pCi/g	2.E-07
				Potassium-40	23.3	pCi/g	US EPA RAGS Part A	3.88E+00	pCi	7.98E-07	risk/yr per pCi/g	3.E-06
				Radium-226	1.08	pCi/g	US EPA RAGS Part A	1.80E-01	pCi	8.49E-06	risk/yr per pCi/g	2.E-06
				Radium-228	1.68	pCi/g	US EPA RAGS Part A	2.80E-01	pCi	1.23E-05	risk/yr per pCi/g	3.E-06
				Thorium-228	1.8	pCi/g	US EPA RAGS Part A	3.00E-01	pCi	5.59E-09	risk/yr per pCi/g	2.E-09
				Thorium-230	1.55	pCi/g	US EPA RAGS Part A	2.58E-01	pCi	8.19E-10	risk/yr per pCi/g	2.E-10
				Thorium-232	1.61	pCi/g	US EPA RAGS Part A	2.68E-01	pCi	3.42E-10	risk/yr per pCi/g	9.E-11
				Thorium-234	0.981	pCi/g	US EPA RAGS Part A	1.63E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
				Uranium-234	1.31	pCi/g	US EPA RAGS Part A	2.18E-01	pCi	2.52E-10	risk/yr per pCi/g	5.E-11
				Uranium-238	1.26	pCi/g	US EPA RAGS Part A	2.10E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
			Exp. Route Total									8.E-06
		Exposure Point Total										9.E-06
	Exposure Medium Total											9.E-06
Medium Total												9.E-06
Surface Water	Surface Water	Emory River Reach A	Ingestion	Radium-226	0.88	pCi/L	US EPA RAGS Part A	6.65E+01	pCi	7.30E-10	risk/pCi	5.E-08
				Uranium-234	0.265	pCi/L	US EPA RAGS Part A	2.00E+01	pCi	1.58E-10	risk/pCi	3.E-09
				Uranium-238	0.171	pCi/L	US EPA RAGS Part A	1.29E+01	pCi	2.10E-10	risk/pCi	3.E-09
			Exp. Route Total									5.E-08
			Exp. Route Total									5.E-08
		Exposure Point Total										5.E-08
	Exposure Medium Total											5.E-08
Medium Total												5.E-08

Total of Receptor Risks Across All Media 9.E-06

TABLE 8.4.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach A	Ingestion	Cesium-137	0.406	pCi/g	US EPA RAGS Part A	2.19E+01	pCi	4.33E-11	risk/pCi	9.E-10
				Potassium-40	23.3	pCi/g	US EPA RAGS Part A	1.26E+03	pCi	6.18E-11	risk/pCi	8.E-08
				Radium-226	1.08	pCi/g	US EPA RAGS Part A	5.83E+01	pCi	7.30E-10	risk/pCi	4.E-08
				Radium-228	1.68	pCi/g	US EPA RAGS Part A	9.07E+01	pCi	2.29E-09	risk/pCi	2.E-07
				Thorium-228	1.8	pCi/g	US EPA RAGS Part A	9.72E+01	pCi	2.89E-10	risk/pCi	3.E-08
				Thorium-230	1.55	pCi/g	US EPA RAGS Part A	8.37E+01	pCi	2.02E-10	risk/pCi	2.E-08
				Thorium-232	1.61	pCi/g	US EPA RAGS Part A	8.69E+01	pCi	2.31E-10	risk/pCi	2.E-08
				Thorium-234	0.981	pCi/g	US EPA RAGS Part A	5.30E+01	pCi	6.70E-11	risk/pCi	4.E-09
				Uranium-234	1.31	pCi/g	US EPA RAGS Part A	7.07E+01	pCi	1.58E-10	risk/pCi	1.E-08
				Uranium-238	1.26	pCi/g	US EPA RAGS Part A	6.80E+01	pCi	2.10E-10	risk/pCi	1.E-08
			Exp. Route Total									4.E-07
			External Exposure	Cesium-137	0.406	pCi/g	US EPA RAGS Part A	2.82E-02	pCi	2.54E-06	risk/yr per pCi/g	7.E-08
				Potassium-40	23.3	pCi/g	US EPA RAGS Part A	1.62E+00	pCi	7.98E-07	risk/yr per pCi/g	1.E-06
				Radium-226	1.08	pCi/g	US EPA RAGS Part A	7.49E-02	pCi	8.49E-06	risk/yr per pCi/g	6.E-07
				Radium-228	1.68	pCi/g	US EPA RAGS Part A	1.17E-01	pCi	1.23E-05	risk/yr per pCi/g	1.E-06
				Thorium-228	1.8	pCi/g	US EPA RAGS Part A	1.25E-01	pCi	5.59E-09	risk/yr per pCi/g	7.E-10
				Thorium-230	1.55	pCi/g	US EPA RAGS Part A	1.07E-01	pCi	8.19E-10	risk/yr per pCi/g	9.E-11
				Thorium-232	1.61	pCi/g	US EPA RAGS Part A	1.12E-01	pCi	3.42E-10	risk/yr per pCi/g	4.E-11
				Thorium-234	0.981	pCi/g	US EPA RAGS Part A	6.80E-02	pCi	1.14E-07	risk/yr per pCi/g	8.E-09
				Uranium-234	1.31	pCi/g	US EPA RAGS Part A	9.08E-02	pCi	2.52E-10	risk/yr per pCi/g	2.E-11
				Uranium-238	1.26	pCi/g	US EPA RAGS Part A	8.74E-02	pCi	1.14E-07	risk/yr per pCi/g	1.E-08
			Exp. Route Total									3.E-06
		Exposure Point Total										4.E-06
	Exposure Medium Total											4.E-06
Medium Total												4.E-06
Surface Water	Surface Water	Emory River Reach A	Ingestion	Radium-226	0.88	pCi/L	US EPA RAGS Part A	2.77E+01	pCi	7.30E-10	risk/pCi	2.E-08
				Uranium-234	0.265	pCi/L	US EPA RAGS Part A	8.35E+00	pCi	1.58E-10	risk/pCi	1.E-09
				Uranium-238	0.171	pCi/L	US EPA RAGS Part A	5.39E+00	pCi	2.10E-10	risk/pCi	1.E-09
			Exp. Route Total									2.E-08
		Exposure Point Total										2.E-08
	Exposure Medium Total											2.E-08
Medium Total												2.E-08

Total of Receptor Risks Across All Media	4.E-06

TABLE 8.5.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Potassium-40	2.978	pCi/g	US EPA RAGS Part A	1.35E+03	pCi	6.18E-11	risk/pCi	8.E-08
				Radium-226	0.143	pCi/g	US EPA RAGS Part A	6.49E+01	pCi	7.30E-10	risk/pCi	5.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.6.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Potassium-40	3.578	pCi/g	US EPA RAGS Part A	1.62E+03	pCi	6.18E-11	risk/pCi	1.E-07
				Radium-226	0.11	pCi/g	US EPA RAGS Part A	4.99E+01	pCi	7.30E-10	risk/pCi	4.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.7.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Potassium-40	2.98E+00	pCi/g	US EPA RAGS Part A	3.38E+02	pCi	6.18E-11	risk/pCi	2.E-08
				Radium-226	0.143	pCi/g	US EPA RAGS Part A	1.62E+01	pCi	7.30E-10	risk/pCi	1.E-08
			Exp. Route Total									3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media 3.E-08

TABLE 8.8.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Potassium-40	3.58E+00	pCi/g	US EPA RAGS Part A	4.06E+02	pCi	6.18E-11	risk/pCi	3.E-08
				Radium-226	0.11	pCi/g	US EPA RAGS Part A	1.25E+01	pCi	7.30E-10	risk/pCi	9.E-09
			Exp. Route Total									3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media 3.E-08

TABLE 8.9.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach B	Ingestion	Thorium-230	0.132	pCi/L	US EPA RAGS Part A	2.22E+03	pCi	2.02E-10	risk/pCi	4.E-07
				Uranium-234	0.173	pCi/L	US EPA RAGS Part A	2.91E+03	pCi	1.58E-10	risk/pCi	5.E-07
				Uranium-238	0.109	pCi/L	US EPA RAGS Part A	1.83E+03	pCi	2.10E-10	risk/pCi	4.E-07
			Exp. Route Total									1.E-06
		Exposure Point Total										1.E-06
	Exposure Medium Total											1.E-06
Medium Total												1.E-06

Total of Receptor Risks Across All Media 1.E-06

TABLE 8.10.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach B	Ingestion	Thorium-230	0.132	pCi/L	US EPA RAGS Part A	2.77E+02	pCi	2.02E-10	risk/pCi	6.E-08
				Uranium-234	0.173	pCi/L	US EPA RAGS Part A	3.63E+02	pCi	1.58E-10	risk/pCi	6.E-08
				Uranium-238	0.109	pCi/L	US EPA RAGS Part A	2.29E+02	pCi	2.10E-10	risk/pCi	5.E-08
			Exp. Route Total									2.E-07
Medium Total												2.E-07

Total of Receptor Risks Across All Media 2.E-07

TABLE 8.11.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach B	Ingestion	Cesium-137	0.328	pCi/g	US EPA RAGS Part A	3.54E+01	pCi	4.33E-11	risk/pCi	2.E-09
				Potassium-40	42.8	pCi/g	US EPA RAGS Part A	4.62E+03	pCi	6.18E-11	risk/pCi	3.E-07
				Radium-226	3.68	pCi/g	US EPA RAGS Part A	3.97E+02	pCi	7.30E-10	risk/pCi	3.E-07
				Radium-228	2.82	pCi/g	US EPA RAGS Part A	3.05E+02	pCi	2.29E-09	risk/pCi	7.E-07
				Thorium-228	2.64	pCi/g	US EPA RAGS Part A	2.85E+02	pCi	2.89E-10	risk/pCi	8.E-08
				Thorium-230	4.11	pCi/g	US EPA RAGS Part A	4.44E+02	pCi	2.02E-10	risk/pCi	9.E-08
				Thorium-232	3.03	pCi/g	US EPA RAGS Part A	3.27E+02	pCi	2.31E-10	risk/pCi	8.E-08
				Thorium-234	4.37	pCi/g	US EPA RAGS Part A	4.72E+02	pCi	6.70E-11	risk/pCi	3.E-08
				Uranium-234	2.94	pCi/g	US EPA RAGS Part A	3.18E+02	pCi	1.58E-10	risk/pCi	5.E-08
				Uranium-235	0.13	pCi/g	US EPA RAGS Part A	1.40E+01	pCi	4.63E-10	risk/pCi	7.E-09
				Uranium-238	3.53	pCi/g	US EPA RAGS Part A	3.81E+02	pCi	2.10E-10	risk/pCi	8.E-08
			Exp. Route Total									2.E-06
			External Exposure	Cesium-137	0.328	pCi/g	US EPA RAGS Part A	5.46E-02	pCi	2.54E-06	risk/yr per pCi/g	1.E-07
				Potassium-40	42.8	pCi/g	US EPA RAGS Part A	7.12E+00	pCi	7.98E-07	risk/yr per pCi/g	6.E-06
				Radium-226	3.68	pCi/g	US EPA RAGS Part A	6.12E-01	pCi	8.49E-06	risk/yr per pCi/g	5.E-06
				Radium-228	2.82	pCi/g	US EPA RAGS Part A	4.69E-01	pCi	1.23E-05	risk/yr per pCi/g	6.E-06
				Thorium-228	2.64	pCi/g	US EPA RAGS Part A	4.39E-01	pCi	5.59E-09	risk/yr per pCi/g	2.E-09
				Thorium-230	4.11	pCi/g	US EPA RAGS Part A	6.84E-01	pCi	8.19E-10	risk/yr per pCi/g	6.E-10
				Thorium-232	3.03	pCi/g	US EPA RAGS Part A	5.04E-01	pCi	3.42E-10	risk/yr per pCi/g	2.E-10
				Thorium-234	4.37	pCi/g	US EPA RAGS Part A	7.27E-01	pCi	1.14E-07	risk/yr per pCi/g	8.E-08
				Uranium-234	2.94	pCi/g	US EPA RAGS Part A	4.89E-01	pCi	2.52E-10	risk/yr per pCi/g	1.E-10
				Uranium-235	0.13	pCi/g	US EPA RAGS Part A	2.16E-02	pCi	5.20E-07	risk/yr per pCi/g	1.E-08
				Uranium-238	3.53	pCi/g	US EPA RAGS Part A	5.88E-01	pCi	1.14E-07	risk/yr per pCi/g	7.E-08
			Exp. Route Total									2.E-05
		Exposure Point Total										2.E-05
	Exposure Medium Total											2.E-05
Medium Total												2.E-05
Surface Water	Surface Water	Emory River Reach B	Ingestion	Thorium-230	0.132	pCi/L	US EPA RAGS Part A	9.98E+00	pCi	2.02E-10	risk/pCi	2.E-09
				Uranium-234	0.173	pCi/L	US EPA RAGS Part A	1.31E+01	pCi	1.58E-10	risk/pCi	2.E-09
				Uranium-238	0.109	pCi/L	US EPA RAGS Part A	8.24E+00	pCi	2.10E-10	risk/pCi	2.E-09
			Exp. Route Total									6.E-09
			Exp. Route Total									6.E-09
		Exposure Point Total										6.E-09
	Exposure Medium Total											6.E-09
Medium Total												6.E-09

Total of Receptor Risks Across All Media 2.E-05

TABLE 8.12.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach B	Ingestion	Cesium-137	0.328	pCi/g	US EPA RAGS Part A	1.77E+01	pCi	4.33E-11	risk/pCi	8.E-10
				Potassium-40	42.8	pCi/g	US EPA RAGS Part A	2.31E+03	pCi	6.18E-11	risk/pCi	1.E-07
				Radium-226	3.68	pCi/g	US EPA RAGS Part A	1.99E+02	pCi	7.30E-10	risk/pCi	1.E-07
				Radium-228	2.82	pCi/g	US EPA RAGS Part A	1.52E+02	pCi	2.29E-09	risk/pCi	3.E-07
				Thorium-228	2.64	pCi/g	US EPA RAGS Part A	1.43E+02	pCi	2.89E-10	risk/pCi	4.E-08
				Thorium-230	4.11	pCi/g	US EPA RAGS Part A	2.22E+02	pCi	2.02E-10	risk/pCi	4.E-08
				Thorium-232	3.03	pCi/g	US EPA RAGS Part A	1.64E+02	pCi	2.31E-10	risk/pCi	4.E-08
				Thorium-234	4.37	pCi/g	US EPA RAGS Part A	2.36E+02	pCi	6.70E-11	risk/pCi	2.E-08
				Uranium-234	2.94	pCi/g	US EPA RAGS Part A	1.59E+02	pCi	1.58E-10	risk/pCi	3.E-08
				Uranium-235	0.13	pCi/g	US EPA RAGS Part A	7.02E+00	pCi	4.63E-10	risk/pCi	3.E-09
				Uranium-238	3.53	pCi/g	US EPA RAGS Part A	1.91E+02	pCi	2.10E-10	risk/pCi	4.E-08
			Exp. Route Total									8.E-07
			External Exposure	Cesium-137	0.328	pCi/g	US EPA RAGS Part A	2.27E-02	pCi	2.54E-06	risk/yr per pCi/g	6.E-08
				Potassium-40	42.8	pCi/g	US EPA RAGS Part A	2.97E+00	pCi	7.98E-07	risk/yr per pCi/g	2.E-06
				Radium-226	3.68	pCi/g	US EPA RAGS Part A	2.55E-01	pCi	8.49E-06	risk/yr per pCi/g	2.E-06
				Radium-228	2.82	pCi/g	US EPA RAGS Part A	1.96E-01	pCi	1.23E-05	risk/yr per pCi/g	2.E-06
				Thorium-228	2.64	pCi/g	US EPA RAGS Part A	1.83E-01	pCi	5.59E-09	risk/yr per pCi/g	1.E-09
				Thorium-230	4.11	pCi/g	US EPA RAGS Part A	2.85E-01	pCi	8.19E-10	risk/yr per pCi/g	2.E-10
				Thorium-232	3.03	pCi/g	US EPA RAGS Part A	2.10E-01	pCi	3.42E-10	risk/yr per pCi/g	7.E-11
				Thorium-234	4.37	pCi/g	US EPA RAGS Part A	3.03E-01	pCi	1.14E-07	risk/yr per pCi/g	3.E-08
				Uranium-234	2.94	pCi/g	US EPA RAGS Part A	2.04E-01	pCi	2.52E-10	risk/yr per pCi/g	5.E-11
				Uranium-235	0.13	pCi/g	US EPA RAGS Part A	9.02E-03	pCi	5.20E-07	risk/yr per pCi/g	5.E-09
				Uranium-238	3.53	pCi/g	US EPA RAGS Part A	2.45E-01	pCi	1.14E-07	risk/yr per pCi/g	3.E-08
			Exp. Route Total									7.E-06
		Exposure Point Total										8.E-06
	Exposure Medium Total											8.E-06
Medium Total												8.E-06
Surface Water	Surface Water	Emory River Reach B	Ingestion	Thorium-230	0.132	pCi/L	US EPA RAGS Part A	4.16E+00	pCi	2.02E-10	risk/pCi	8.E-10
				Uranium-234	0.173	pCi/L	US EPA RAGS Part A	5.45E+00	pCi	1.58E-10	risk/pCi	9.E-10
				Uranium-238	0.109	pCi/L	US EPA RAGS Part A	3.43E+00	pCi	2.10E-10	risk/pCi	7.E-10
			Exp. Route Total									2.E-09
		Exposure Point Total										2.E-09
	Exposure Medium Total											2.E-09
Medium Total												2.E-09

Total of Receptor Risks Across All Media 8.E-06

TABLE 8.13.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach B	Ingestion	Potassium-40	3.57	pCi/g	US EPA RAGS Part A	1.62E+03	pCi	6.18E-11	risk/pCi	1.E-07
				Radium-226	0.0615	pCi/g	US EPA RAGS Part A	2.79E+01	pCi	7.30E-10	risk/pCi	2.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.14.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion	Potassium-40	2.88E+00	pCi/g	US EPA RAGS Part A	1.31E+03	pCi	6.18E-11	risk/pCi	8.E-08
				Radium-226	0.0904	pCi/g	US EPA RAGS Part A	4.10E+01	pCi	7.30E-10	risk/pCi	3.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.15.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach B	Ingestion	Potassium-40	3.57	pCi/g	US EPA RAGS Part A	4.05E+02	pCi	6.18E-11	risk/pCi	3.E-08
				Radium-226	0.0615	pCi/g	US EPA RAGS Part A	6.97E+00	pCi	7.30E-10	risk/pCi	5.E-09
			Exp. Route Total									3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media 3.E-08

TABLE 8.16.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion	Potassium-40	2.88E+00	pCi/g	US EPA RAGS Part A	3.27E+02	pCi	6.18E-11	risk/pCi	2.E-08
				Radium-226	0.0904	pCi/g	US EPA RAGS Part A	1.03E+01	pCi	7.30E-10	risk/pCi	7.E-09
			Exp. Route Total									3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media 3.E-08

TABLE 8.17.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach C	Ingestion	Radium-228	3.77	pCi/L	US EPA RAGS Part A	6.33E+04	pCi	2.29E-09	risk/pCi	1.E-04
				Uranium-234	0.251	pCi/L	US EPA RAGS Part A	4.22E+03	pCi	1.58E-10	risk/pCi	7.E-07
				Uranium-238	0.252	pCi/L	US EPA RAGS Part A	4.23E+03	pCi	2.10E-10	risk/pCi	9.E-07
			Exp. Route Total									1.E-04
		Exposure Point Total										1.E-04
	Exposure Medium Total											1.E-04
Medium Total												1.E-04

Total of Receptor Risks Across All Media 1.E-04

TABLE 8.18.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reach C	Ingestion	Radium-228	3.77	pCi/L	US EPA RAGS Part A	7.92E+03	pCi	2.29E-09	risk/pCi	2.E-05
				Uranium-234	0.251	pCi/L	US EPA RAGS Part A	5.27E+02	pCi	1.58E-10	risk/pCi	8.E-08
				Uranium-238	0.252	pCi/L	US EPA RAGS Part A	5.29E+02	pCi	2.10E-10	risk/pCi	1.E-07
			Exp. Route Total									2.E-05
Medium Total												2.E-05

Total of Receptor Risks Across All Media 2.E-05

TABLE 8.19.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach C	Ingestion	Cesium-137	0.0496	pCi/g	US EPA RAGS Part A	5.36E+00	pCi	4.33E-11	risk/pCi	2.E-10
				Potassium-40	7.43	pCi/g	US EPA RAGS Part A	8.02E+02	pCi	6.18E-11	risk/pCi	5.E-08
				Radium-226	0.945	pCi/g	US EPA RAGS Part A	1.02E+02	pCi	7.30E-10	risk/pCi	7.E-08
				Radium-228	1.07	pCi/g	US EPA RAGS Part A	1.16E+02	pCi	2.29E-09	risk/pCi	3.E-07
				Thorium-228	0.81	pCi/g	US EPA RAGS Part A	8.75E+01	pCi	2.89E-10	risk/pCi	3.E-08
				Thorium-230	5.21	pCi/g	US EPA RAGS Part A	5.63E+02	pCi	2.02E-10	risk/pCi	1.E-07
				Thorium-232	0.961	pCi/g	US EPA RAGS Part A	1.04E+02	pCi	2.31E-10	risk/pCi	2.E-08
				Thorium-234	2.36	pCi/g	US EPA RAGS Part A	2.55E+02	pCi	6.70E-11	risk/pCi	2.E-08
				Uranium-234	0.871	pCi/g	US EPA RAGS Part A	9.41E+01	pCi	1.58E-10	risk/pCi	1.E-08
				Uranium-235	0.0532	pCi/g	US EPA RAGS Part A	5.75E+00	pCi	1.63E-10	risk/pCi	9.E-10
				Uranium-238	0.809	pCi/g	US EPA RAGS Part A	8.74E+01	pCi	2.10E-10	risk/pCi	2.E-08
			Exp. Route Total									6.E-07
			External Exposure	Cesium-137	0.0496	pCi/g	US EPA RAGS Part A	8.26E-03	pCi	2.54E-06	risk/yr per pCi/g	2.E-08
				Potassium-40	7.43	pCi/g	US EPA RAGS Part A	1.24E+00	pCi	7.98E-07	risk/yr per pCi/g	1.E-06
				Radium-226	0.945	pCi/g	US EPA RAGS Part A	1.57E-01	pCi	8.49E-06	risk/yr per pCi/g	1.E-06
				Radium-228	1.07	pCi/g	US EPA RAGS Part A	1.78E-01	pCi	1.23E-05	risk/yr per pCi/g	2.E-06
				Thorium-228	0.81	pCi/g	US EPA RAGS Part A	1.35E-01	pCi	5.59E-09	risk/yr per pCi/g	8.E-10
				Thorium-230	5.21	pCi/g	US EPA RAGS Part A	8.67E-01	pCi	8.19E-10	risk/yr per pCi/g	7.E-10
				Thorium-232	0.961	pCi/g	US EPA RAGS Part A	1.60E-01	pCi	3.42E-10	risk/yr per pCi/g	5.E-11
				Thorium-234	2.36	pCi/g	US EPA RAGS Part A	3.93E-01	pCi	1.14E-07	risk/yr per pCi/g	4.E-08
				Uranium-234	0.871	pCi/g	US EPA RAGS Part A	1.45E-01	pCi	2.52E-10	risk/yr per pCi/g	4.E-11
				Uranium-235	0.0532	pCi/g	US EPA RAGS Part A	8.85E-03	pCi	5.20E-07	risk/yr per pCi/g	5.E-09
				Uranium-238	0.809	pCi/g	US EPA RAGS Part A	1.35E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
			Exp. Route Total									5.E-06
		Exposure Point Total										5.E-06
	Exposure Medium Total											5.E-06
Medium Total												5.E-06
Surface Water	Surface Water	Emory River Reach C	Ingestion	Radium-228	3.77	pCi/L	US EPA RAGS Part A	2.85E+02	pCi	2.29E-09	risk/pCi	7.E-07
				Uranium-234	0.251	pCi/L	US EPA RAGS Part A	1.90E+01	pCi	1.58E-10	risk/pCi	3.E-09
				Uranium-238	0.252	pCi/L	US EPA RAGS Part A	1.91E+01	pCi	2.10E-10	risk/pCi	4.E-09
			Exp. Route Total									7.E-07
			Exp. Route Total									7.E-07
		Exposure Point Total										7.E-07
	Exposure Medium Total											7.E-07
Medium Total												7.E-07

Total of Receptor Risks Across All Media	6.E-06

TABLE 8.20.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reach C	Ingestion	Cesium-137	0.0496	pCi/g	US EPA RAGS Part A	2.68E+00	pCi	4.33E-11	risk/pCi	1.E-10
				Potassium-40	7.43	pCi/g	US EPA RAGS Part A	4.01E+02	pCi	6.18E-11	risk/pCi	2.E-08
				Radium-226	0.945	pCi/g	US EPA RAGS Part A	5.10E+01	pCi	7.30E-10	risk/pCi	4.E-08
				Radium-228	1.07	pCi/g	US EPA RAGS Part A	5.78E+01	pCi	2.29E-09	risk/pCi	1.E-07
				Thorium-228	0.81	pCi/g	US EPA RAGS Part A	4.37E+01	pCi	2.89E-10	risk/pCi	1.E-08
				Thorium-230	5.21	pCi/g	US EPA RAGS Part A	2.81E+02	pCi	2.02E-10	risk/pCi	6.E-08
				Thorium-232	0.961	pCi/g	US EPA RAGS Part A	5.19E+01	pCi	2.31E-10	risk/pCi	1.E-08
				Thorium-234	2.36	pCi/g	US EPA RAGS Part A	1.27E+02	pCi	6.70E-11	risk/pCi	9.E-09
				Uranium-234	0.871	pCi/g	US EPA RAGS Part A	4.70E+01	pCi	1.58E-10	risk/pCi	7.E-09
				Uranium-235	0.0532	pCi/g	US EPA RAGS Part A	2.87E+00	pCi	1.63E-10	risk/pCi	5.E-10
				Uranium-238	0.809	pCi/g	US EPA RAGS Part A	4.37E+01	pCi	2.10E-10	risk/pCi	9.E-09
			Exp. Route Total									3.E-07
			External Exposure	Cesium-137	0.0496	pCi/g	US EPA RAGS Part A	3.44E-03	pCi	2.54E-06	risk/yr per pCi/g	9.E-09
				Potassium-40	7.43	pCi/g	US EPA RAGS Part A	5.15E-01	pCi	7.98E-07	risk/yr per pCi/g	4.E-07
				Radium-226	0.945	pCi/g	US EPA RAGS Part A	6.55E-02	pCi	8.49E-06	risk/yr per pCi/g	6.E-07
				Radium-228	1.07	pCi/g	US EPA RAGS Part A	7.42E-02	pCi	1.23E-05	risk/yr per pCi/g	9.E-07
				Thorium-228	0.81	pCi/g	US EPA RAGS Part A	5.62E-02	pCi	5.59E-09	risk/yr per pCi/g	3.E-10
				Thorium-230	5.21	pCi/g	US EPA RAGS Part A	3.61E-01	pCi	8.19E-10	risk/yr per pCi/g	3.E-10
				Thorium-232	0.961	pCi/g	US EPA RAGS Part A	6.66E-02	pCi	3.42E-10	risk/yr per pCi/g	2.E-11
				Thorium-234	2.36	pCi/g	US EPA RAGS Part A	1.64E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
				Uranium-234	0.871	pCi/g	US EPA RAGS Part A	6.04E-02	pCi	2.52E-10	risk/yr per pCi/g	2.E-11
				Uranium-235	0.0532	pCi/g	US EPA RAGS Part A	3.69E-03	pCi	5.20E-07	risk/yr per pCi/g	2.E-09
				Uranium-238	0.809	pCi/g	US EPA RAGS Part A	5.61E-02	pCi	1.14E-07	risk/yr per pCi/g	6.E-09
			Exp. Route Total									2.E-06
		Exposure Point Total										2.E-06
	Exposure Medium Total											2.E-06
Medium Total												2.E-06
Surface Water	Surface Water	Emory River Reach C	Ingestion	Radium-228	3.77	pCi/L	US EPA RAGS Part A	1.19E+02	pCi	2.29E-09	risk/pCi	3.E-07
				Uranium-234	0.251	pCi/L	US EPA RAGS Part A	7.91E+00	pCi	1.58E-10	risk/pCi	1.E-09
				Uranium-238	0.252	pCi/L	US EPA RAGS Part A	7.94E+00	pCi	2.10E-10	risk/pCi	2.E-09
			Exp. Route Total									3.E-07
		Exposure Point Total										3.E-07
	Exposure Medium Total											3.E-07
Medium Total												3.E-07

Total of Receptor Risks Across All Media 2.E-06

TABLE 8.21.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Off-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Uranium-238	0.147	pCi/L	US EPA RAGS Part A	2.47E+03	pCi	2.10E-10	risk/pCi	5.E-07
			Exp. Route Total									5.E-07
		Exposure Point Total										5.E-07
	Exposure Medium Total											5.E-07
Medium Total												5.E-07

Total of Receptor Risks Across All Media 5.E-07

TABLE 8.22.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Off-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Uranium-238	0.147	pCi/L	US EPA RAGS Part A	3.09E+02	pCi	2.10E-10	risk/pCi	6.E-08
			Exp. Route Total									6.E-08
Medium Total												6.E-08

Total of Receptor Risks Across All Media 6.E-08

TABLE 8.23.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC Value	EPC Units	Risk Calculation Approach	Intake/Activity Value	Intake/Activity Units	CSF Value	CSF Units	Cancer Risk
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reference Reach	Ingestion	Cesium-137	4.90E-02	pCi/g	US EPA RAGS Part A	5.29E+00	pCi	4.33E-11	risk/pCi	2.E-10
				Potassium-40	5.1	pCi/g	US EPA RAGS Part A	5.51E+02	pCi	6.18E-11	risk/pCi	3.E-08
				Radium-226	0.689	pCi/g	US EPA RAGS Part A	7.44E+01	pCi	7.30E-10	risk/pCi	5.E-08
				Radium-228	0.734	pCi/g	US EPA RAGS Part A	7.93E+01	pCi	2.29E-09	risk/pCi	2.E-07
				Thorium-228	0.874	pCi/g	US EPA RAGS Part A	9.44E+01	pCi	2.89E-10	risk/pCi	3.E-08
				Thorium-230	0.516	pCi/g	US EPA RAGS Part A	5.57E+01	pCi	2.02E-10	risk/pCi	1.E-08
				Thorium-232	0.72	pCi/g	US EPA RAGS Part A	7.78E+01	pCi	2.31E-10	risk/pCi	2.E-08
				Thorium-234	1.27	pCi/g	US EPA RAGS Part A	1.37E+02	pCi	6.70E-11	risk/pCi	9.E-09
				Uranium-234	0.497	pCi/g	US EPA RAGS Part A	5.37E+01	pCi	1.58E-10	risk/pCi	8.E-09
				Uranium-235	0.0648	pCi/g	US EPA RAGS Part A	7.00E+00	pCi	1.63E-10	risk/pCi	1.E-09
				Uranium-238	0.515	pCi/g	US EPA RAGS Part A	5.56E+01	pCi	2.10E-10	risk/pCi	1.E-08
			Exp. Route Total									4.E-07
			External Exposure	Cesium-137	4.90E-02	pCi/g	US EPA RAGS Part A	8.16E-03	pCi	2.54E-06	risk/yr per pCi/g	2.E-08
				Potassium-40	5.1	pCi/g	US EPA RAGS Part A	8.49E-01	pCi	7.98E-07	risk/yr per pCi/g	7.E-07
				Radium-226	0.689	pCi/g	US EPA RAGS Part A	1.15E-01	pCi	8.49E-06	risk/yr per pCi/g	1.E-06
				Radium-228	0.734	pCi/g	US EPA RAGS Part A	1.22E-01	pCi	1.23E-05	risk/yr per pCi/g	2.E-06
				Thorium-228	0.874	pCi/g	US EPA RAGS Part A	1.45E-01	pCi	5.59E-09	risk/yr per pCi/g	8.E-10
				Thorium-230	0.516	pCi/g	US EPA RAGS Part A	8.59E-02	pCi	8.19E-10	risk/yr per pCi/g	7.E-11
				Thorium-232	0.72	pCi/g	US EPA RAGS Part A	1.20E-01	pCi	3.42E-10	risk/yr per pCi/g	4.E-11
				Thorium-234	1.27	pCi/g	US EPA RAGS Part A	2.11E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
				Uranium-234	0.497	pCi/g	US EPA RAGS Part A	8.27E-02	pCi	2.52E-10	risk/yr per pCi/g	2.E-11
				Uranium-235	0.0648	pCi/g	US EPA RAGS Part A	1.08E-02	pCi	5.20E-07	risk/yr per pCi/g	6.E-09
				Uranium-238	0.515	pCi/g	US EPA RAGS Part A	8.57E-02	pCi	1.14E-07	risk/yr per pCi/g	1.E-08
			Exp. Route Total									3.E-06
		Exposure Point Total										4.E-06
	Exposure Medium Total											4.E-06
Medium Total												4.E-06
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Uranium-238	0.147	pCi/L	US EPA RAGS Part A	1.11E+01	pCi	2.10E-10	risk/pCi	2.E-09
			Exp. Route Total									2.E-09
			Exp. Route Total									2.E-09
		Exposure Point Total										2.E-09
	Exposure Medium Total											2.E-09
Medium Total												2.E-09

Total of Receptor Risks Across All Media 4.E-06

TABLE 8.24.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC Value	EPC Units	Risk Calculation Approach	Intake/Activity Value	Intake/Activity Units	CSF Value	CSF Units	Cancer Risk
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reference Reach	Ingestion	Cesium-137	4.90E-02	pCi/g	US EPA RAGS Part A	2.65E+00	pCi	4.33E-11	risk/pCi	1.E-10
				Potassium-40	5.1	pCi/g	US EPA RAGS Part A	2.75E+02	pCi	6.18E-11	risk/pCi	2.E-08
				Radium-226	0.689	pCi/g	US EPA RAGS Part A	3.72E+01	pCi	7.30E-10	risk/pCi	3.E-08
				Radium-228	0.734	pCi/g	US EPA RAGS Part A	3.96E+01	pCi	2.29E-09	risk/pCi	9.E-08
				Thorium-228	0.874	pCi/g	US EPA RAGS Part A	4.72E+01	pCi	2.89E-10	risk/pCi	1.E-08
				Thorium-230	0.516	pCi/g	US EPA RAGS Part A	2.79E+01	pCi	2.02E-10	risk/pCi	6.E-09
				Thorium-232	0.72	pCi/g	US EPA RAGS Part A	3.89E+01	pCi	2.31E-10	risk/pCi	9.E-09
				Thorium-234	1.27	pCi/g	US EPA RAGS Part A	6.86E+01	pCi	6.70E-11	risk/pCi	5.E-09
				Uranium-234	0.497	pCi/g	US EPA RAGS Part A	2.68E+01	pCi	1.58E-10	risk/pCi	4.E-09
				Uranium-235	0.0648	pCi/g	US EPA RAGS Part A	3.50E+00	pCi	1.63E-10	risk/pCi	6.E-10
				Uranium-238	0.515	pCi/g	US EPA RAGS Part A	2.78E+01	pCi	2.10E-10	risk/pCi	6.E-09
			Exp. Route Total									2.E-07
			External Exposure	Cesium-137	4.90E-02	pCi/g	US EPA RAGS Part A	3.40E-03	pCi	2.54E-06	risk/yr per pCi/g	9.E-09
				Potassium-40	5.1	pCi/g	US EPA RAGS Part A	3.54E-01	pCi	7.98E-07	risk/yr per pCi/g	3.E-07
				Radium-226	0.689	pCi/g	US EPA RAGS Part A	4.78E-02	pCi	8.49E-06	risk/yr per pCi/g	4.E-07
				Radium-228	0.734	pCi/g	US EPA RAGS Part A	5.09E-02	pCi	1.23E-05	risk/yr per pCi/g	6.E-07
				Thorium-228	0.874	pCi/g	US EPA RAGS Part A	6.06E-02	pCi	5.59E-09	risk/yr per pCi/g	3.E-10
				Thorium-230	0.516	pCi/g	US EPA RAGS Part A	3.58E-02	pCi	8.19E-10	risk/yr per pCi/g	3.E-11
				Thorium-232	0.72	pCi/g	US EPA RAGS Part A	4.99E-02	pCi	3.42E-10	risk/yr per pCi/g	2.E-11
				Thorium-234	1.27	pCi/g	US EPA RAGS Part A	8.81E-02	pCi	1.14E-07	risk/yr per pCi/g	1.E-08
				Uranium-234	0.497	pCi/g	US EPA RAGS Part A	3.45E-02	pCi	2.52E-10	risk/yr per pCi/g	9.E-12
				Uranium-235	0.0648	pCi/g	US EPA RAGS Part A	4.49E-03	pCi	5.20E-07	risk/yr per pCi/g	2.E-09
				Uranium-238	0.515	pCi/g	US EPA RAGS Part A	3.57E-02	pCi	1.14E-07	risk/yr per pCi/g	4.E-09
			Exp. Route Total									1.E-06
		Exposure Point Total										2.E-06
	Exposure Medium Total											2.E-06
Medium Total												2.E-06
Surface Water	Surface Water	Emory River Reference Reach	Ingestion	Uranium-238	0.147	pCi/L	US EPA RAGS Part A	4.63E+00	pCi	2.10E-10	risk/pCi	1.E-09
			Exp. Route Total									1.E-09
		Exposure Point Total										1.E-09
	Exposure Medium Total											1.E-09
Medium Total												1.E-09

Total of Receptor Risks Across All Media: 2.E-06

TABLE 8.25.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion	Radium-226	9.74E-02	pCi/g	US EPA RAGS Part A	4.42E+01	pCi	7.30E-10	risk/pCi	3.E-08
			Exp. Route Total									3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media 3.E-08

TABLE 8.26.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Potassium-40	3.46E+00	pCi/g	US EPA RAGS Part A	1.57E+03	pCi	6.18E-11	risk/pCi	1.E-07
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.27.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion	Radium-226	9.74E-02	pCi/g	US EPA RAGS Part A	1.10E+01	pCi	7.30E-10	risk/pCi	8.E-09
			Exp. Route Total									8.E-09
Medium Total												8.E-09

Total of Receptor Risks Across All Media: 8.E-09

TABLE 8.28.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Potassium-40	3.46E+00	pCi/g	US EPA RAGS Part A	3.92E+02	pCi	6.18E-11	risk/pCi	2.E-08
			Exp. Route Total									2.E-08
Medium Total												2.E-08

Total of Receptor Risks Across All Media: 2.E-08

TABLE 8.29.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Uranium-234	0.155	pCi/L	US EPA RAGS Part A	2.60E+03	pCi	1.58E-10	risk/pCi	4.E-07
			Exp. Route Total									4.E-07
		Exposure Point Total										4.E-07
	Exposure Medium Total											4.E-07
Medium Total												4.E-07

Total of Receptor Risks Across All Media 4.E-07

TABLE 8.30.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Uranium-234	0.155	pCi/L	US EPA RAGS Part A	3.26E+02	pCi	1.58E-10	risk/pCi	5.E-08
			Exp. Route Total									5.E-08
Medium Total												5.E-08

Total of Receptor Risks Across All Media 5.E-08

TABLE 8.31.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach A	Ingestion	Cesium-137	1.07E+00	pCi/g	US EPA RAGS Part A	1.16E+02	pCi	4.33E-11	risk/pCi	5.E-09
				Potassium-40	21.6	pCi/g	US EPA RAGS Part A	2.33E+03	pCi	6.18E-11	risk/pCi	1.E-07
				Radium-226	1.63	pCi/g	US EPA RAGS Part A	1.76E+02	pCi	7.30E-10	risk/pCi	1.E-07
				Radium-228	2.02	pCi/g	US EPA RAGS Part A	2.18E+02	pCi	2.29E-09	risk/pCi	5.E-07
				Thorium-228	2.51	pCi/g	US EPA RAGS Part A	2.71E+02	pCi	2.89E-10	risk/pCi	8.E-08
				Thorium-230	1.61	pCi/g	US EPA RAGS Part A	1.74E+02	pCi	2.02E-10	risk/pCi	4.E-08
				Thorium-232	1.84	pCi/g	US EPA RAGS Part A	1.99E+02	pCi	2.31E-10	risk/pCi	5.E-08
				Uranium-234	1.52	pCi/g	US EPA RAGS Part A	1.64E+02	pCi	1.58E-10	risk/pCi	3.E-08
				Uranium-235	0.206	pCi/g	US EPA RAGS Part A	2.22E+01	pCi	1.63E-10	risk/pCi	4.E-09
				Uranium-238	1.42	pCi/g	US EPA RAGS Part A	1.53E+02	pCi	2.10E-10	risk/pCi	3.E-08
			Exp. Route Total									1.E-06
			External Exposure	Cesium-137	1.07E+00	pCi/g	US EPA RAGS Part A	1.78E-01	pCi	2.54E-06	risk/yr per pCi/g	5.E-07
				Potassium-40	21.6	pCi/g	US EPA RAGS Part A	3.60E+00	pCi	7.98E-07	risk/yr per pCi/g	3.E-06
				Radium-226	1.63	pCi/g	US EPA RAGS Part A	2.71E-01	pCi	8.49E-06	risk/yr per pCi/g	2.E-06
				Radium-228	2.02	pCi/g	US EPA RAGS Part A	3.36E-01	pCi	1.23E-05	risk/yr per pCi/g	4.E-06
				Thorium-228	2.51	pCi/g	US EPA RAGS Part A	4.18E-01	pCi	5.59E-09	risk/yr per pCi/g	2.E-09
				Thorium-230	1.61	pCi/g	US EPA RAGS Part A	2.68E-01	pCi	8.19E-10	risk/yr per pCi/g	2.E-10
				Thorium-232	1.84	pCi/g	US EPA RAGS Part A	3.06E-01	pCi	3.42E-10	risk/yr per pCi/g	1.E-10
				Uranium-234	1.52	pCi/g	US EPA RAGS Part A	2.53E-01	pCi	2.52E-10	risk/yr per pCi/g	6.E-11
				Uranium-235	0.206	pCi/g	US EPA RAGS Part A	3.43E-02	pCi	5.20E-07	risk/yr per pCi/g	2.E-08
				Uranium-238	1.42	pCi/g	US EPA RAGS Part A	2.36E-01	pCi	1.14E-07	risk/yr per pCi/g	3.E-08
			Exp. Route Total									1.E-05
		Exposure Point Total										1.E-05
	Exposure Medium Total											1.E-05
Medium Total												1.E-05
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Uranium-234	0.155	pCi/L	US EPA RAGS Part A	1.17E+01	pCi	1.58E-10	risk/pCi	2.E-09
			Exp. Route Total									2.E-09
			Exp. Route Total									2.E-09
		Exposure Point Total										2.E-09
	Exposure Medium Total											2.E-09
Medium Total												2.E-09

Total of Receptor Risks Across All Media: 1.E-05

TABLE 8.32.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach A	Ingestion	Cesium-137	1.07E+00	pCi/g	US EPA RAGS Part A	5.78E+01	pCi	4.33E-11	risk/pCi	3.E-09
				Potassium-40	21.6	pCi/g	US EPA RAGS Part A	1.17E+03	pCi	6.18E-11	risk/pCi	7.E-08
				Radium-226	1.63	pCi/g	US EPA RAGS Part A	8.80E+01	pCi	7.30E-10	risk/pCi	6.E-08
				Radium-228	2.02	pCi/g	US EPA RAGS Part A	1.09E+02	pCi	2.29E-09	risk/pCi	2.E-07
				Thorium-228	2.51	pCi/g	US EPA RAGS Part A	1.36E+02	pCi	2.89E-10	risk/pCi	4.E-08
				Thorium-230	1.61	pCi/g	US EPA RAGS Part A	8.69E+01	pCi	2.02E-10	risk/pCi	2.E-08
				Thorium-232	1.84	pCi/g	US EPA RAGS Part A	9.94E+01	pCi	2.31E-10	risk/pCi	2.E-08
				Uranium-234	1.52	pCi/g	US EPA RAGS Part A	8.21E+01	pCi	1.58E-10	risk/pCi	1.E-08
				Uranium-235	0.206	pCi/g	US EPA RAGS Part A	1.11E+01	pCi	1.63E-10	risk/pCi	2.E-09
				Uranium-238	1.42	pCi/g	US EPA RAGS Part A	7.67E+01	pCi	2.10E-10	risk/pCi	2.E-08
			Exp. Route Total									5.E-07
			External Exposure	Cesium-137	1.07E+00	pCi/g	US EPA RAGS Part A	7.42E-02	pCi	2.54E-06	risk/yr per pCi/g	2.E-07
				Potassium-40	21.6	pCi/g	US EPA RAGS Part A	1.50E+00	pCi	7.98E-07	risk/yr per pCi/g	1.E-06
				Radium-226	1.63	pCi/g	US EPA RAGS Part A	1.13E-01	pCi	8.49E-06	risk/yr per pCi/g	1.E-06
				Radium-228	2.02	pCi/g	US EPA RAGS Part A	1.40E-01	pCi	1.23E-05	risk/yr per pCi/g	2.E-06
				Thorium-228	2.51	pCi/g	US EPA RAGS Part A	1.74E-01	pCi	5.59E-09	risk/yr per pCi/g	1.E-09
				Thorium-230	1.61	pCi/g	US EPA RAGS Part A	1.12E-01	pCi	8.19E-10	risk/yr per pCi/g	9.E-11
				Thorium-232	1.84	pCi/g	US EPA RAGS Part A	1.28E-01	pCi	3.42E-10	risk/yr per pCi/g	4.E-11
				Uranium-234	1.52	pCi/g	US EPA RAGS Part A	1.05E-01	pCi	2.52E-10	risk/yr per pCi/g	3.E-11
				Uranium-235	0.206	pCi/g	US EPA RAGS Part A	1.43E-02	pCi	5.20E-07	risk/yr per pCi/g	7.E-09
				Uranium-238	1.42	pCi/g	US EPA RAGS Part A	9.85E-02	pCi	1.14E-07	risk/yr per pCi/g	1.E-08
			Exp. Route Total									4.E-06
		Exposure Point Total										5.E-06
	Exposure Medium Total											5.E-06
Medium Total												5.E-06
Surface Water	Surface Water	Clinch River Reach A	Ingestion	Uranium-234	0.155	pCi/L	US EPA RAGS Part A	4.88E+00	pCi	1.58E-10	risk/pCi	8.E-10
			Exp. Route Total									8.E-10
		Exposure Point Total										8.E-10
	Exposure Medium Total											8.E-10
Medium Total												8.E-10

Total of Receptor Risks Across All Media 5.E-06

TABLE 8.33.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion	Potassium-40	3.19E+00	pCi/g	US EPA RAGS Part A	1.45E+03	pCi	6.18E-11	risk/pCi	9.E-08
				Radium-226	0.0544	pCi/g	US EPA RAGS Part A	2.47E+01	pCi	7.30E-10	risk/pCi	2.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.34.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Potassium-40	8.90E-03	mg/kg	US EPA RAGS Part A	4.04E+00	pCi	6.18E-11	risk/pCi	2.E-10
				Radium-226	3.10E-03	mg/kg	US EPA RAGS Part A	1.41E+00	pCi	7.30E-10	risk/pCi	1.E-09
			Exp. Route Total									1.E-09
Medium Total												1.E-09

Total of Receptor Risks Across All Media 1.E-09

TABLE 8.35.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion	Potassium-40	8.33E-02	mg/kg	US EPA RAGS Part A	9.45E+00	pCi	6.18E-11	risk/pCi	6.E-10
				Radium-226	2.34E-01	mg/kg	US EPA RAGS Part A	2.65E+01	pCi	7.30E-10	risk/pCi	2.E-08
			Exp. Route Total									2.E-08
Medium Total												2.E-08

Total of Receptor Risks Across All Media 2.E-08

TABLE 8.36.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Potassium-40	8.90E-03	mg/kg	US EPA RAGS Part A	1.01E+00	pCi	6.18E-11	risk/pCi	6.E-11
				Radium-226	3.10E-03	mg/kg	US EPA RAGS Part A	3.52E-01	pCi	7.30E-10	risk/pCi	3.E-10
			Exp. Route Total									3.E-10
Medium Total												3.E-10

Total of Receptor Risks Across All Media 3.E-10

TABLE 8.37.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Radium-226	0.499	pCi/L	US EPA RAGS Part A	8.38E+03	pCi	7.30E-10	risk/pCi	6.E-06
				Uranium-234	0.156	pCi/L	US EPA RAGS Part A	2.62E+03	pCi	1.58E-10	risk/pCi	4.E-07
				Uranium-238	0.172	pCi/L	US EPA RAGS Part A	2.89E+03	pCi	2.10E-10	risk/pCi	6.E-07
			Exp. Route Total									7.E-06
		Exposure Point Total										7.E-06
	Exposure Medium Total											7.E-06
Medium Total												7.E-06

Total of Receptor Risks Across All Media 7.E-06

TABLE 8.38.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Radium-226	0.499	pCi/L	US EPA RAGS Part A	1.05E+03	pCi	7.30E-10	risk/pCi	8.E-07
				Uranium-234	0.156	pCi/L	US EPA RAGS Part A	3.28E+02	pCi	1.58E-10	risk/pCi	5.E-08
				Uranium-238	0.172	pCi/L	US EPA RAGS Part A	3.61E+02	pCi	2.10E-10	risk/pCi	8.E-08
			Exp. Route Total									9.E-07
Medium Total												9.E-07

Total of Receptor Risks Across All Media 9.E-07

TABLE 8.39.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach B	Ingestion	Cesium-137	2.84E+00	pCi/g	US EPA RAGS Part A	3.07E+02	pCi	4.33E-11	risk/pCi	1.E-08
				Potassium-40	28.1	pCi/g	US EPA RAGS Part A	3.03E+03	pCi	6.18E-11	risk/pCi	2.E-07
				Radium-226	0.925	pCi/g	US EPA RAGS Part A	9.99E+01	pCi	7.30E-10	risk/pCi	7.E-08
				Radium-228	1.88	pCi/g	US EPA RAGS Part A	2.03E+02	pCi	2.29E-09	risk/pCi	5.E-07
				Thorium-228	1.42	pCi/g	US EPA RAGS Part A	1.53E+02	pCi	2.89E-10	risk/pCi	4.E-08
				Thorium-230	1.24	pCi/g	US EPA RAGS Part A	1.34E+02	pCi	2.02E-10	risk/pCi	3.E-08
				Thorium-232	1.36	pCi/g	US EPA RAGS Part A	1.47E+02	pCi	2.31E-10	risk/pCi	3.E-08
				Thorium-234	2.08	pCi/g	US EPA RAGS Part A	2.25E+02	pCi	6.70E-11	risk/pCi	2.E-08
				Uranium-234	1.2	pCi/g	US EPA RAGS Part A	1.30E+02	pCi	1.58E-10	risk/pCi	2.E-08
				Uranium-238	1.15	pCi/g	US EPA RAGS Part A	1.24E+02	pCi	2.10E-10	risk/pCi	3.E-08
			Exp. Route Total									9.E-07
			External Exposure	Cesium-137	2.84E+00	pCi/g	US EPA RAGS Part A	4.73E-01	pCi	2.54E-06	risk/yr per pCi/g	1.E-06
				Potassium-40	28.1	pCi/g	US EPA RAGS Part A	4.68E+00	pCi	7.98E-07	risk/yr per pCi/g	4.E-06
				Radium-226	0.925	pCi/g	US EPA RAGS Part A	1.54E-01	pCi	8.49E-06	risk/yr per pCi/g	1.E-06
				Radium-228	1.88	pCi/g	US EPA RAGS Part A	3.13E-01	pCi	1.23E-05	risk/yr per pCi/g	4.E-06
				Thorium-228	1.42	pCi/g	US EPA RAGS Part A	2.36E-01	pCi	5.59E-09	risk/yr per pCi/g	1.E-09
				Thorium-230	1.24	pCi/g	US EPA RAGS Part A	2.06E-01	pCi	8.19E-10	risk/yr per pCi/g	2.E-10
				Thorium-232	1.36	pCi/g	US EPA RAGS Part A	2.26E-01	pCi	3.42E-10	risk/yr per pCi/g	8.E-11
				Thorium-234	2.08	pCi/g	US EPA RAGS Part A	3.46E-01	pCi	1.14E-07	risk/yr per pCi/g	4.E-08
				Uranium-234	1.2	pCi/g	US EPA RAGS Part A	2.00E-01	pCi	2.52E-10	risk/yr per pCi/g	5.E-11
				Uranium-238	1.15	pCi/g	US EPA RAGS Part A	1.91E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
			Exp. Route Total									1.E-05
		Exposure Point Total										1.E-05
	Exposure Medium Total											1.E-05
Medium Total												1.E-05
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Radium-226	0.499	pCi/L	US EPA RAGS Part A	3.77E+01	pCi	7.30E-10	risk/pCi	3.E-08
				Uranium-234	0.156	pCi/L	US EPA RAGS Part A	1.18E+01	pCi	1.58E-10	risk/pCi	2.E-09
				Uranium-238	0.172	pCi/L	US EPA RAGS Part A	1.30E+01	pCi	2.10E-10	risk/pCi	3.E-09
			Exp. Route Total									3.E-08
			Exp. Route Total									3.E-08
		Exposure Point Total										3.E-08
	Exposure Medium Total											3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media: 1.E-05

TABLE 8.40.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach B	Ingestion	Cesium-137	2.84E+00	pCi/g	US EPA RAGS Part A	1.53E+02	pCi	4.33E-11	risk/pCi	7.E-09
				Potassium-40	28.1	pCi/g	US EPA RAGS Part A	1.52E+03	pCi	6.18E-11	risk/pCi	9.E-08
				Radium-226	0.925	pCi/g	US EPA RAGS Part A	5.00E+01	pCi	7.30E-10	risk/pCi	4.E-08
				Radium-228	1.88	pCi/g	US EPA RAGS Part A	1.02E+02	pCi	2.29E-09	risk/pCi	2.E-07
				Thorium-228	1.42	pCi/g	US EPA RAGS Part A	7.67E+01	pCi	2.89E-10	risk/pCi	2.E-08
				Thorium-230	1.24	pCi/g	US EPA RAGS Part A	6.70E+01	pCi	2.02E-10	risk/pCi	1.E-08
				Thorium-232	1.36	pCi/g	US EPA RAGS Part A	7.34E+01	pCi	2.31E-10	risk/pCi	2.E-08
				Thorium-234	2.08	pCi/g	US EPA RAGS Part A	1.12E+02	pCi	6.70E-11	risk/pCi	8.E-09
				Uranium-234	1.2	pCi/g	US EPA RAGS Part A	6.48E+01	pCi	1.58E-10	risk/pCi	1.E-08
				Uranium-238	1.15	pCi/g	US EPA RAGS Part A	6.21E+01	pCi	2.10E-10	risk/pCi	1.E-08
			Exp. Route Total									5.E-07
			External Exposure	Cesium-137	2.84E+00	pCi/g	US EPA RAGS Part A	1.97E-01	pCi	2.54E-06	risk/yr per pCi/g	5.E-07
				Potassium-40	28.1	pCi/g	US EPA RAGS Part A	1.95E+00	pCi	7.98E-07	risk/yr per pCi/g	2.E-06
				Radium-226	0.925	pCi/g	US EPA RAGS Part A	6.41E-02	pCi	8.49E-06	risk/yr per pCi/g	5.E-07
				Radium-228	1.88	pCi/g	US EPA RAGS Part A	1.30E-01	pCi	1.23E-05	risk/yr per pCi/g	2.E-06
				Thorium-228	1.42	pCi/g	US EPA RAGS Part A	9.85E-02	pCi	5.59E-09	risk/yr per pCi/g	6.E-10
				Thorium-230	1.24	pCi/g	US EPA RAGS Part A	8.60E-02	pCi	8.19E-10	risk/yr per pCi/g	7.E-11
				Thorium-232	1.36	pCi/g	US EPA RAGS Part A	9.43E-02	pCi	3.42E-10	risk/yr per pCi/g	3.E-11
				Thorium-234	2.08	pCi/g	US EPA RAGS Part A	1.44E-01	pCi	1.14E-07	risk/yr per pCi/g	2.E-08
				Uranium-234	1.2	pCi/g	US EPA RAGS Part A	8.32E-02	pCi	2.52E-10	risk/yr per pCi/g	2.E-11
				Uranium-238	1.15	pCi/g	US EPA RAGS Part A	7.98E-02	pCi	1.14E-07	risk/yr per pCi/g	9.E-09
			Exp. Route Total									4.E-06
		Exposure Point Total										5.E-06
	Exposure Medium Total											5.E-06
Medium Total												5.E-06
Surface Water	Surface Water	Clinch River Reach B	Ingestion	Radium-226	0.499	pCi/L	US EPA RAGS Part A	1.57E+01	pCi	7.30E-10	risk/pCi	1.E-08
				Uranium-234	0.156	pCi/L	US EPA RAGS Part A	4.91E+00	pCi	1.58E-10	risk/pCi	8.E-10
				Uranium-238	0.172	pCi/L	US EPA RAGS Part A	5.42E+00	pCi	2.10E-10	risk/pCi	1.E-09
			Exp. Route Total									1.E-08
		Exposure Point Total										1.E-08
	Exposure Medium Total											1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media 5.E-06

TABLE 8.41.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Uranium-234	0.268	pCi/L	US EPA RAGS Part A	4.50E+03	pCi	1.58E-10	risk/pCi	7.E-07
				Uranium-238	0.129	pCi/L	US EPA RAGS Part A	2.17E+03	pCi	2.10E-10	risk/pCi	5.E-07
			Exp. Route Total									1.E-06
		Exposure Point Total										1.E-06
	Exposure Medium Total											1.E-06
Medium Total												1.E-06

Total of Receptor Risks Across All Media 1.E-06

TABLE 8.42.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Uranium-234	0.268	pCi/L	US EPA RAGS Part A	5.63E+02	pCi	1.58E-10	risk/pCi	9.E-08
				Uranium-238	0.129	pCi/L	US EPA RAGS Part A	2.71E+02	pCi	2.10E-10	risk/pCi	6.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.43.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Uranium-234	0.268	pCi/L	US EPA RAGS Part A	2.03E+01	pCi	1.58E-10	risk/pCi	3.E-09
				Uranium-238	0.129	pCi/L	US EPA RAGS Part A	9.75E+00	pCi	2.10E-10	risk/pCi	2.E-09
			Exp. Route Total									5.E-09
			Exp. Route Total									5.E-09
		Exposure Point Total										5.E-09
	Exposure Medium Total											5.E-09
Medium Total												5.E-09

Total of Receptor Risks Across All Media 5.E-09

TABLE 8.44.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Clinch River Reference Reach	Ingestion	Uranium-234	0.268	pCi/L	US EPA RAGS Part A	8.44E+00	pCi	1.58E-10	risk/pCi	1.E-09
				Uranium-238	0.129	pCi/L	US EPA RAGS Part A	4.06E+00	pCi	2.10E-10	risk/pCi	9.E-10
			Exp. Route Total									2.E-09
		Exposure Point Total										2.E-09
	Exposure Medium Total											2.E-09
Medium Total												2.E-09

Total of Receptor Risks Across All Media 2.E-09

TABLE 8.45.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reference Reach	Ingestion	Potassium-40	3.22E+00	pCi/g	US EPA RAGS Part A	1.46E+03	pCi	6.18E-11	risk/pCi	9.E-08
				Thorium-230	8.41E-02	pCi/g	US EPA RAGS Part A	3.81E+01	pCi	2.02E-10	risk/pCi	8.E-09
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.46.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reference Reach	Ingestion	Potassium-40	3.52E+00	pCi/g	US EPA RAGS Part A	1.60E+03	pCi	6.18E-11	risk/pCi	1.E-07
				Radium-226	5.89E-02	pCi/g	US EPA RAGS Part A	2.67E+01	pCi	7.30E-10	risk/pCi	2.E-08
			Exp. Route Total									1.E-07
Medium Total												1.E-07

Total of Receptor Risks Across All Media 1.E-07

TABLE 8.47.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reference Reach	Ingestion	Potassium-40	3.22E+00	pCi/g	US EPA RAGS Part A	3.65E+02	pCi	6.18E-11	risk/pCi	2.E-08
				Thorium-230	8.41E-02	pCi/g	US EPA RAGS Part A	9.54E+00	pCi	2.02E-10	risk/pCi	2.E-09
			Exp. Route Total									2.E-08
Medium Total												2.E-08

Total of Receptor Risks Across All Media 2.E-08

TABLE 8.48.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reference Reach	Ingestion	Potassium-40	3.52E+00	pCi/g	US EPA RAGS Part A	3.99E+02	pCi	6.18E-11	risk/pCi	2.E-08
				Radium-226	5.89E-02	pCi/g	US EPA RAGS Part A	6.68E+00	pCi	7.30E-10	risk/pCi	5.E-09
			Exp. Route Total									3.E-08
Medium Total												3.E-08

Total of Receptor Risks Across All Media 3.E-08

TABLE 8.49.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Radium-226	0.609	pCi/L	US EPA RAGS Part A	1.02E+04	pCi	7.30E-10	risk/pCi	7.E-06
				Thorium-230	0.235	pCi/L	US EPA RAGS Part A	3.95E+03	pCi	2.02E-10	risk/pCi	8.E-07
			Exp. Route Total									8.E-06
		Exposure Point Total										8.E-06
	Exposure Medium Total											8.E-06
Medium Total												8.E-06

Total of Receptor Risks Across All Media 8.E-06

TABLE 8.50.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Radium-226	0.609	pCi/L	US EPA RAGS Part A	1.28E+03	pCi	7.30E-10	risk/pCi	9.E-07
				Thorium-230	0.235	pCi/L	US EPA RAGS Part A	4.94E+02	pCi	2.02E-10	risk/pCi	1.E-07
			Exp. Route Total									1.E-06
Medium Total												1.E-06

Total of Receptor Risks Across All Media 1.E-06

TABLE 8.51.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Radium-226	0.609	pCi/L	US EPA RAGS Part A	4.60E+01	pCi	7.30E-10	risk/pCi	3.E-08
				Thorium-230	0.235	pCi/L	US EPA RAGS Part A	1.78E+01	pCi	2.02E-10	risk/pCi	4.E-09
			Exp. Route Total									4.E-08
			Exp. Route Total									4.E-08
		Exposure Point Total										4.E-08
	Exposure Medium Total											4.E-08
Medium Total												4.E-08

Total of Receptor Risks Across All Media 4.E-08

TABLE 8.52.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reach B	Ingestion	Radium-226	0.609	pCi/L	US EPA RAGS Part A	1.92E+01	pCi	7.30E-10	risk/pCi	1.E-08
				Thorium-230	0.235	pCi/L	US EPA RAGS Part A	7.40E+00	pCi	2.02E-10	risk/pCi	1.E-09
			Exp. Route Total									2.E-08
		Exposure Point Total										2.E-08
	Exposure Medium Total											2.E-08
Medium Total												2.E-08

Total of Receptor Risks Across All Media 2.E-08

TABLE 8.53.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Uranium-234	0.16	pCi/L	US EPA RAGS Part A	2.69E+03	pCi	1.58E-10	risk/pCi	4.E-07
			Exp. Route Total									4.E-07
		Exposure Point Total										4.E-07
	Exposure Medium Total											4.E-07
Medium Total												4.E-07

Total of Receptor Risks Across All Media 4.E-07

TABLE 8.54.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Uranium-234	0.16	pCi/L	US EPA RAGS Part A	3.36E+02	pCi	1.58E-10	risk/pCi	5.E-08
			Exp. Route Total									5.E-08
Medium Total												5.E-08

Total of Receptor Risks Across All Media 5.E-08

TABLE 8.55.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Uranium-234	0.16	pCi/L	US EPA RAGS Part A	1.21E+01	pCi	1.58E-10	risk/pCi	2.E-09
			Exp. Route Total									2.E-09
			Exp. Route Total									2.E-09
		Exposure Point Total										2.E-09
	Exposure Medium Total											2.E-09
Medium Total												2.E-09

Total of Receptor Risks Across All Media 2.E-09

TABLE 8.56.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Surface Water	Surface Water	Tennessee River Reference Reach	Ingestion	Uranium-234	0.16	pCi/L	US EPA RAGS Part A	5.04E+00	pCi	1.58E-10	risk/pCi	8.E-10
			Exp. Route Total									8.E-10
		Exposure Point Total										8.E-10
	Exposure Medium Total											8.E-10
Medium Total												8.E-10

Total of Receptor Risks Across All Media 8.E-10

TABLE 8.57.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Potassium-40	2.98E+00	pCi/g	US EPA RAGS Part A	1.63E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	1.43E-01	pCi/g	US EPA RAGS Part A	7.81E+00	pCi	7.30E-10	risk/pCi	6.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media	1.E-08

TABLE 8.58.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Potassium-40	3.58E+00	pCi/g	US EPA RAGS Part A	1.95E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	1.10E-01	pCi/g	US EPA RAGS Part A	6.01E+00	pCi	7.30E-10	risk/pCi	4.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media	1.E-08

TABLE 8.59.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach A	Ingestion	Potassium-40	2.98E+00	pCi/g	US EPA RAGS Part A	4.06E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	1.43E-01	pCi/g	US EPA RAGS Part A	1.95E+00	pCi	7.30E-10	risk/pCi	1.E-09
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.60.RME
CALCULATION OF RADIATION CANCER RISKS
Reasonable Maximum Exposure
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach A	Ingestion	Potassium-40	3.58E+00	pCi/g	US EPA RAGS Part A	4.88E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	1.10E-01	pCi/g	US EPA RAGS Part A	1.50E+00	pCi	7.30E-10	risk/pCi	1.E-09
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.61.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach B	Ingestion	Potassium-40	3.57E+00	pCi/g	US EPA RAGS Part A	1.95E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	6.15E-02	pCi/g	US EPA RAGS Part A	3.36E+00	pCi	7.30E-10	risk/pCi	2.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media	1.E-08

TABLE 8.62.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion	Potassium-40	2.88E+00	pCi/g	US EPA RAGS Part A	1.57E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	9.04E-02	pCi/g	US EPA RAGS Part A	4.94E+00	pCi	7.30E-10	risk/pCi	4.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media	1.E-08

TABLE 8.63.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reach B	Ingestion	Potassium-40	3.57E+00	pCi/g	US EPA RAGS Part A	4.87E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	6.15E-02	pCi/g	US EPA RAGS Part A	8.39E-01	pCi	7.30E-10	risk/pCi	6.E-10
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.64.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reach B	Ingestion	Potassium-40	2.88E+00	pCi/g	US EPA RAGS Part A	3.94E+01	pCi	6.18E-11	risk/pCi	2.E-09
				Radium-226	9.04E-02	pCi/g	US EPA RAGS Part A	1.23E+00	pCi	7.30E-10	risk/pCi	9.E-10
			Exp. Route Total									2.E-09
Medium Total												2.E-09

Total of Receptor Risks Across All Media 2.E-09

TABLE 8.65.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion	Potassium-40	3.41E+00	pCi/g	US EPA RAGS Part A	1.86E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	9.74E-02	pCi/g	US EPA RAGS Part A	5.32E+00	pCi	7.30E-10	risk/pCi	4.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media | 1.E-08

TABLE 8.66.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Potassium-40	3.46E+00	pCi/g	US EPA RAGS Part A	1.89E+02	pCi	6.18E-11	risk/pCi	1.E-08
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media | 1.E-08

TABLE 8.67.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Emory River Reference Reach	Ingestion	Potassium-40	3.41E+00	pCi/g	US EPA RAGS Part A	4.65E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	9.74E-02	pCi/g	US EPA RAGS Part A	1.33E+00	pCi	7.30E-10	risk/pCi	1.E-09
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.68.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Emory River Reference Reach	Ingestion	Potassium-40	3.46E+00	4,4'-DDT	US EPA RAGS Part A	4.72E+01	pCi	6.18E-11	risk/pCi	3.E-09
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.69.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion	Potassium-40	3.19E+00	pCi/g	US EPA RAGS Part A	1.74E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	5.44E-02	pCi/g	US EPA RAGS Part A	2.97E+00	pCi	7.30E-10	risk/pCi	2.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media 1.E-08

TABLE 8.70.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Potassium-40	3.49E+00	pCi/g	US EPA RAGS Part A	1.91E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	6.18E-02	pCi/g	US EPA RAGS Part A	3.37E+00	pCi	7.30E-10	risk/pCi	2.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media 1.E-08

TABLE 8.71.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion	Potassium-40	3.19E+00	pCi/g	US EPA RAGS Part A	4.35E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	5.44E-02	pCi/g	US EPA RAGS Part A	7.43E-01	pCi	7.30E-10	risk/pCi	5.E-10
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.72.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Potassium-40	3.49E+00	pCi/g	US EPA RAGS Part A	4.77E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	6.18E-02	pCi/g	US EPA RAGS Part A	8.44E-01	pCi	7.30E-10	risk/pCi	6.E-10
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.73.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion	Potassium-40	3.22E+00	pCi/g	US EPA RAGS Part A	1.76E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Thorium-230	8.41E-02	pCi/g	US EPA RAGS Part A	4.59E+00	pCi	2.02E-10	risk/pCi	9.E-10
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media 1.E-08

TABLE 8.74.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Potassium-40	3.52E+00	pCi/g	US EPA RAGS Part A	1.92E+02	pCi	6.18E-11	risk/pCi	1.E-08
				Radium-226	5.89E-02	pCi/g	US EPA RAGS Part A	3.22E+00	pCi	7.30E-10	risk/pCi	2.E-09
			Exp. Route Total									1.E-08
Medium Total												1.E-08

Total of Receptor Risks Across All Media 1.E-08

TABLE 8.75.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Bass	Bass	Clinch River Reach A	Ingestion	Potassium-40	3.22E+00	pCi/g	US EPA RAGS Part A	4.39E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Thorium-230	8.41E-02	pCi/g	US EPA RAGS Part A	1.15E+00	pCi	2.02E-10	risk/pCi	2.E-10
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 8.76.RME

CALCULATION OF RADIATION CANCER RISKS

Reasonable Maximum Exposure

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
					Value	Units		Intake/Activity		CSF		Cancer Risk
								Value	Units	Value	Units	
Catfish	Catfish	Clinch River Reach A	Ingestion	Potassium-40	3.52E+00	pCi/g	US EPA RAGS Part A	4.80E+01	pCi	6.18E-11	risk/pCi	3.E-09
				Radium-226	5.89E-02	pCi/g	US EPA RAGS Part A	8.04E-01	pCi	7.30E-10	risk/pCi	6.E-10
			Exp. Route Total									3.E-09
Medium Total												3.E-09

Total of Receptor Risks Across All Media 3.E-09

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach A	Aluminum	NA		NA		NA	Neurological	0.0041		0.000021	0.0041
			Antimony	NA		NA		NA	blood	0.029		0.00015	0.029
			Arsenic	2.E-05		1.E-07		2.E-05	skin	0.16		0.00082	0.16
			Barium	NA		NA		NA	Kidney	0.0059		0.000031	0.0059
			Boron	NA		NA		NA	weight	0.0031		0.000016	0.0031
			Chromium	NA		NA		NA	None	0.0077		0.000040	0.0077
			Copper	NA		NA		NA	Gastrointestinal tract	0.0012		0.0000060	0.0012
			Iron	NA		NA		NA	Gastrointestinal tract	0.0047		0.000025	0.0048
			Manganese	NA		NA		NA	CNS	0.036		0.00019	0.036
			Mercury	NA		NA		NA	autoimmune	0.017		0.000091	0.017
			Molybdenum	NA		NA		NA	blood	0.0061		0.000032	0.0061
			Nickel	NA		NA		NA	weight	0.00076		0.00000079	0.00076
			Selenium	NA		NA		NA	selenosis	0.0026		0.000014	0.0027
			Strontium	NA		NA		NA	bone	0.0054		0.000028	0.0055
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.011		0.000059	0.011
			Zinc	NA		NA		NA	blood	0.0013		0.0000039	0.0013
			Radium-226	1.E-05				1.E-05					
			Uranium-234	7.E-07				7.E-07					
			Uranium-238	6.E-07				6.E-07					
			Chemical Total					4.E-05					0.3
		Exposure Point Total						4.E-05					0.3
	Exposure Medium Total							4.E-05					0.3
Medium Total								4.E-05					0.3
Receptor Total							Receptor Risk Total	4.E-05				Receptor HI Total	0.3

TABLE 9.2.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach A	Aluminum	NA		NA		NA	Neurological	0.0095		0.000038	0.0096
			Antimony	NA		NA		NA	blood	0.067		0.00027	0.067
			Arsenic	1.E-05		6.E-07		1.E-05	skin	0.36		0.0014	0.37
			Barium	NA		NA		NA	Kidney	0.014		0.000054	0.014
			Boron	NA		NA		NA	weight	0.0072		0.000028	0.0072
			Chromium	NA		NA		NA	None	0.018		0.000071	0.018
			Copper	NA		NA		NA	Gastrointestinal tract	0.0027		0.000011	0.0027
			Iron	NA		NA		NA	Gastrointestinal tract	0.011		0.000044	0.011
			Manganese	NA		NA		NA	CNS	0.084		0.00033	0.085
			Mercury	NA		NA		NA	autoimmune	0.040		0.00016	0.041
			Molybdenum	NA		NA		NA	blood	0.014		0.000056	0.014
			Nickel	NA		NA		NA	weight	0.0018		0.0000014	0.0018
			Selenium	NA		NA		NA	selenosis	0.0062		0.000024	0.0062
			Strontium	NA		NA		NA	bone	0.013		0.000050	0.013
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.027		0.00011	0.027
			Zinc	NA		NA		NA	blood	0.0029		0.0000069	0.0029
			Radium-226	1.E-06				1.E-06					
			Uranium-234	9.E-08				9.E-08					
			Uranium-238	8.E-08				8.E-08					
			Chemical Total					2.E-05					0.7
		Exposure Point Total						2.E-05					0.7
	Exposure Medium Total							2.E-05					0.7
Medium Total								2.E-05					0.7
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.7

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
easonally Exposed Sedime	easonally Exposed Sedimer	Emory River Reach A	Aluminum	NA		NA		NA	Neurological	0.0077		NA	0.0077
			Antimony	NA		NA		NA	blood	0.00085		NA	0.00085
			Arsenic	2.E-06		3.E-06		4.E-06	skin	0.012		0.017	0.029
			Barium	NA		NA		NA	Kidney	0.00016		NA	0.00016
			Beryllium	NA		NA		NA	intestinal tract	0.00014		NA	0.00014
			Boron	NA		NA		NA	weight	0.000033		NA	0.000033
			Chromium	NA		NA		NA	None	0.0031		NA	0.0031
			Cobalt	NA		NA		NA	Thyroid	0.016		NA	0.016
			Copper	NA		NA		NA	Gastrointestinal tract	0.00010		NA	0.00010
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000075		NA	0.000075
			Lead	NA		NA		NA	NA	NA		NA	NA
			Manganese	NA		NA		NA	CNS	0.0020		NA	0.0020
			Mercury	NA		NA		NA	autoimmune	0.000054		NA	0.000054
			Nickel	NA		NA		NA	weight	0.00024		NA	0.00024
			Selenium	NA		NA		NA	selenosis	0.00011		NA	0.00011
			Strontium	NA		NA		NA	bone	0.000032		NA	0.000032
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0021		NA	0.0021
			Zinc	NA		NA		NA	blood	0.000047		NA	0.000047
			Iron	NA		NA		NA	Gastrointestinal tract	0.011		NA	0.011
			Anthracene	NA		NA		NA	None	0.00000000063		0.0000000037	0.0000000043
			Benzo(a)anthracene	4.E-10		2.E-09		3.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	4.E-09		2.E-08		3.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	1.E-09		8.E-09		9.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	8.E-11		5.E-10		6.E-10	NA	NA		NA	NA
			Chrysene	6.E-12		4.E-11		4.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	6.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.000000056		0.00000033	0.00000039
			Indeno(1,2,3-cd)pyrene	1.E-10		8.E-10		9.E-10	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.0000000072		0.000000033	0.000000040
			Phenanthrene	NA		NA		NA	NA	0.000000013		0.000000060	0.000000073

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Pyrene	NA		NA		NA	kidney	0.00000011		0.00000049	0.00000059
			alpha-Chlordane	5.E-10		9.E-10		1.E-09	NA	0.0000086		0.000016	0.000024
			beta-BHC	7.E-11		NA		7.E-11	NA	0.000000015		NA	0.000000015
			gamma-Chlordane	8.E-10		1.E-09		2.E-09	NA	0.000014		0.000025	0.000038
			Cesium-137	2.E-09			2.E-07	2.E-07					
			Potassium-40	2.E-07			3.E-06	3.E-06					
			Radium-226	9.E-08			2.E-06	2.E-06					
			Radium-228	4.E-07			3.E-06	4.E-06					
			Thorium-228	6.E-08			2.E-09	6.E-08					
			Thorium-230	3.E-08			2.E-10	3.E-08					
			Thorium-232	4.E-08			9.E-11	4.E-08					
			Thorium-234	7.E-09			2.E-08	3.E-08					
			Uranium-234	2.E-08			5.E-11	2.E-08					
			Uranium-238	3.E-08			2.E-08	5.E-08					
			Chemical Total					1.E-05					0.07
		Exposure Point Total						1.E-05					0.07
	Exposure Medium Total							1.E-05					0.07
Medium Total								1.E-05					0.07
Surface Water	Surface Water	Emory River Reach A	Aluminum	NA		NA		NA	Neurological	0.000018		0.0000066	0.000025
			Antimony	NA		NA		NA	blood	0.00013		0.00031	0.00044
			Arsenic	1.E-07		4.E-08		1.E-07	skin	0.00070		0.00027	0.00097
			Barium	NA		NA		NA	Kidney	0.000026		0.00014	0.00016
			Boron	NA		NA		NA	weight	0.000014		0.0000050	0.000019
			Chromium	NA		NA		NA	None	0.000034		0.00096	0.00099
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000052		0.0000019	0.0000070
			Iron	NA		NA		NA	Gastrointestinal tract	0.000021		0.0000077	0.000029
			Manganese	NA		NA		NA	CNS	0.00016		0.0015	0.0016
			Mercury	NA		NA		NA	autoimmune	0.000078		0.000035	0.00011
			Molybdenum	NA		NA		NA	blood	0.000027		0.0000099	0.000037
			Nickel	NA		NA		NA	weight	0.0000034		0.0000061	0.0000095
			Selenium	NA		NA		NA	selenosis	0.000012		0.0000054	0.000017
			Strontium	NA		NA		NA	bone	0.000024		0.0000088	0.000033
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000051		0.00071	0.00076
			Zinc	NA		NA		NA	blood	0.0000056		0.0000012	0.0000068
			Radium-226	5.E-08				5.E-08					
			Uranium-234	3.E-09				3.E-09					
			Uranium-238	3.E-09				3.E-09					
			Chemical Total					2.E-07					0.005
Medium Total								2.E-07					0.005
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.08

TABLE 9.4.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
easonally Exposed Sedime	easonally Exposed Sedimer	Emory River Reach A	Aluminum	NA		NA		NA	Neurological	0.014		NA	0.014
			Antimony	NA		NA		NA	blood	0.0016		NA	0.0016
			Arsenic	1.E-06		1.E-06		2.E-06	skin	0.022		0.016	0.038
			Barium	NA		NA		NA	Kidney	0.00030		NA	0.00030
			Beryllium	NA		NA		NA	intestinal tract	0.00027		NA	0.00027
			Boron	NA		NA		NA	weight	0.000062		NA	0.000062
			Chromium	NA		NA		NA	None	0.0057		NA	0.0057
			Cobalt	NA		NA		NA	Thyroid	0.029		NA	0.029
			Copper	NA		NA		NA	Gastrointestinal tract	0.00019		NA	0.00019
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.00014		NA	0.00014
			Lead	NA		NA		NA	NA	NA		NA	NA
			Manganese	NA		NA		NA	CNS	0.0038		NA	0.0038
			Mercury	NA		NA		NA	autoimmune	0.00010		NA	0.00010
			Nickel	NA		NA		NA	weight	0.00045		NA	0.00045
			Selenium	NA		NA		NA	selenosis	0.00021		NA	0.00021
			Strontium	NA		NA		NA	bone	0.000060		NA	0.000060
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0039		NA	0.0039
			Zinc	NA		NA		NA	blood	0.000087		NA	0.000087
			Iron	NA		NA		NA	Gastrointestinal tract	0.020		NA	0.020
			Anthracene	NA		NA		NA	None	0.0000000012		0.0000000036	0.0000000047
			Benzo(a)anthracene	2.E-10		9.E-10		1.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	2.E-09		9.E-09		1.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	8.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	5.E-11		2.E-10		3.E-10	NA	NA		NA	NA
			Chrysene	4.E-12		1.E-11		2.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	4.E-10		1.E-09		2.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000011		0.00000032	0.00000043
			Indeno(1,2,3-cd)pyrene	9.E-11		3.E-10		4.E-10	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000014		0.000000032	0.000000045
			Phenanthrene	NA		NA		NA	NA	0.00000020		0.00000047	0.00000067
			Pyrene	NA		NA		NA	kidney	0.00000020		0.00000047	0.00000067

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			alpha-Chlordane	3.E-10		4.E-10		7.E-10	NA	0.000016		0.000015	0.000031
			beta-BHC	5.E-11		NA		5.E-11	NA	0.000000027		NA	0.000000027
			gamma-Chlordane	5.E-10		6.E-10		1.E-09	NA	0.000025		0.000024	0.000049
			Cesium-137	9.E-10			7.E-08	7.E-08					
			Potassium-40	8.E-08			1.E-06	1.E-06					
			Radium-226	4.E-08			6.E-07	7.E-07					
			Radium-228	2.E-07			1.E-06	2.E-06					
			Thorium-228	3.E-08			7.E-10	3.E-08					
			Thorium-230	2.E-08			9.E-11	2.E-08					
			Thorium-232	2.E-08			4.E-11	2.E-08					
			Thorium-234	4.E-09			8.E-09	1.E-08					
			Uranium-234	1.E-08			2.E-11	1.E-08					
			Uranium-238	1.E-08			1.E-08	2.E-08					
			Chemical Total					6.E-06					0.1
		Exposure Point Total						6.E-06					0.1
	Exposure Medium Total							6.E-06					0.1
Medium Total								6.E-06					0.1
Surface Water	Surface Water	Emory River Reach A	Aluminum	NA		NA		NA	Neurological	0.000029		0.0000084	0.000037
			Antimony	NA		NA		NA	blood	0.00020		0.00039	0.00060
			Arsenic	7.E-08		2.E-08		9.E-08	skin	0.0011		0.00034	0.0014
			Barium	NA		NA		NA	Kidney	0.000041		0.00017	0.00021
			Boron	NA		NA		NA	weight	0.000021		0.0000063	0.000028
			Chromium	NA		NA		NA	None	0.000054		0.0012	0.0013
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000081		0.0000024	0.000010
			Iron	NA		NA		NA	Gastrointestinal tract	0.000033		0.0000097	0.000043
			Manganese	NA		NA		NA	CNS	0.00025		0.0019	0.0021
			Mercury	NA		NA		NA	autoimmune	0.00012		0.000045	0.00017
			Molybdenum	NA		NA		NA	blood	0.000043		0.000012	0.000055
			Nickel	NA		NA		NA	weight	0.0000053		0.0000078	0.000013
			Selenium	NA		NA		NA	selenosis	0.000019		0.0000068	0.000025
			Strontium	NA		NA		NA	bone	0.000038		0.000011	0.000049
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000080		0.00090	0.00098
			Zinc	NA		NA		NA	blood	0.0000088		0.0000015	0.000010
			Radium-226	2.E-08				2.E-08					
			Uranium-234	1.E-09				1.E-09					
			Uranium-238	1.E-09				1.E-09					
			Chemical Total					1.E-07					0.007
Medium Total								1.E-07					0.007
Receptor Total							Receptor Risk Total	6.E-06				Receptor HI Total	0.1

TABLE 9.5.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach A	Arsenic	2.E-06				2.E-06	skin	0.012			0.012
			Barium	NA				NA	Kidney	0.00021			0.00021
			Copper	NA				NA	Gastrointestinal tract	0.0063			0.0063
			Manganese	NA				NA	CNS	0.0011			0.0011
			Mercury (methyl)	NA				NA	Neuropsychological	2.6			2.6
			Selenium	NA				NA	selenosis	0.11			0.11
			Strontium	NA				NA	bone	0.00044			0.00044
			Zinc	NA				NA	blood	0.031			0.031
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	7.E-07				7.E-07	NA	NA			NA
			4,4'-DDT	6.E-07				6.E-07	liver	0.0077			0.0077
			Potassium-40	8.E-08				8.E-08					
			Radium-226	5.E-08				5.E-08					
			Chemical Total					1.E-04					3
		Exposure Point Total						1.E-04					3
	Exposure Medium Total							1.E-04					3
Medium Total								1.E-04					3
Receptor Total							Receptor Risk Total	1.E-04				Receptor HI Total	3

TABLE 9.6.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach A											
			Barium	NA				NA	Kidney	0.00045			0.00045
			Chromium	NA				NA	None	0.067			0.067
			Copper	NA				NA	Gastrointestinal tract	0.0084			0.0084
			Iron	NA				NA	Gastrointestinal tract	0.015			0.015
			Manganese	NA				NA	CNS	0.0030			0.0030
			Mercury (methyl)	NA				NA	Neuropsychological	0.86			0.86
			Nickel	NA				NA	weight	0.0059			0.0059
			Selenium	NA				NA	selenosis	0.14			0.14
			Silver	NA				NA	skin	0.0027			0.0027
			Strontium	NA				NA	bone	0.0011			0.0011
			Vanadium	NA				NA	Gastrointestinal tract	0.0087			0.0087
			Zinc	NA				NA	blood	0.040			0.040
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.7.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach A	Arsenic	4.E-06				4.E-06	skin	0.022			0.022
			Barium	NA				NA	Kidney	0.00064			0.00064
			Cadmium	NA				NA	Kidney	0.027			0.027
			Cobalt	NA				NA	Thyroid	0.040			0.040
			Copper	NA				NA	Gastrointestinal tract	0.10			0.10
			Manganese	NA				NA	CNS	0.0027			0.0027
			Mercury (methyl)	NA				NA	Neuropsychological	1.0			1.0
			Nickel	NA				NA	weight	0.0094			0.0094
			Selenium	NA				NA	selenosis	0.061			0.061
			Strontium	NA				NA	bone	0.00066			0.00066
			Zinc	NA				NA	blood	0.022			0.022
			PCB-1254	8.E-05				8.E-05	eye	4.5			4.5
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.014			0.014
			alpha-Chlordane	1.E-06				1.E-06	NA	0.013			0.013
			gamma-Chlordane	6.E-07				6.E-07	NA	0.0084			0.0084
			Potassium-40	1.E-07				1.E-07					
			Radium-226	4.E-08				4.E-08					
			Chemical Total					3.E-04					6
		Exposure Point Total						3.E-04					6
	Exposure Medium Total							3.E-04					6
Medium Total								3.E-04					6
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	6

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach A											
			Copper	NA				NA	Gastrointestinal tract	0.0039			0.0039
			Iron	NA				NA	Gastrointestinal tract	0.018			0.018
			Manganese	NA				NA	CNS	0.0012			0.0012
			Mercury (methyl)	NA				NA	Neuropsychological	1.1			1.1
			Selenium	NA				NA	selenosis	0.079			0.079
			Strontium	NA				NA	bone	0.00040			0.00040
			Zinc	NA				NA	blood	0.023			0.023
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.9.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach A	Arsenic	2.E-06				2.E-06	skin	0.058			0.058
			Barium	NA				NA	Kidney	0.00097			0.00097
			Copper	NA				NA	Gastrointestinal tract	0.030			0.030
			Manganese	NA				NA	CNS	0.0053			0.0053
			Mercury (methyl)	NA				NA	Neuropsychological	12.			12.
			Selenium	NA				NA	selenosis	0.50			0.50
			Strontium	NA				NA	bone	0.0020			0.0020
			Zinc	NA				NA	blood	0.15			0.15
			PCB-1260	9.E-05				9.E-05	NA	NA			NA
			4,4'-DDE	7.E-07				7.E-07	NA	NA			NA
			4,4'-DDT	5.E-07				5.E-07	liver	0.036			0.036
			Potassium-40	2.E-08				2.E-08					
			Radium-226	1.E-08				1.E-08					
			Chemical Total					9.E-05					13
		Exposure Point Total						9.E-05					13
	Exposure Medium Total							9.E-05					13
Medium Total								9.E-05					13
Receptor Total							Receptor Risk Total	9.E-05				Receptor HI Total	13

TABLE 9.10.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach A											
			Barium	NA				NA	Kidney	0.0021			0.0021
			Chromium	NA				NA	None	0.31			0.31
			Copper	NA				NA	Gastrointestinal tract	0.039			0.039
			Iron	NA				NA	Gastrointestinal tract	0.069			0.069
			Manganese	NA				NA	CNS	0.014			0.014
			Mercury (methyl)	NA				NA	Neuropsychological	4.0			4.0
			Nickel	NA				NA	weight	0.028			0.028
			Selenium	NA				NA	selenosis	0.67			0.67
			Silver	NA				NA	skin	0.013			0.013
			Strontium	NA				NA	bone	0.0051			0.0051
			Vanadium	NA				NA	Gastrointestinal tract	0.041			0.041
			Zinc	NA				NA	blood	0.19			0.19
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 9.11.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach A	Arsenic	4.E-06				4.E-06	skin	0.10			0.10
			Barium	NA				NA	Kidney	0.0030			0.0030
			Cadmium	NA				NA	Kidney	0.12			0.12
			Cobalt	NA				NA	Thyroid	0.19			0.19
			Copper	NA				NA	Gastrointestinal tract	0.49			0.49
			Manganese	NA				NA	CNS	0.013			0.013
			Mercury (methyl)	NA				NA	Neuropsychological	4.7			4.7
			Nickel	NA				NA	weight	0.044			0.044
			Selenium	NA				NA	selenosis	0.28			0.28
			Strontium	NA				NA	bone	0.0031			0.0031
			Zinc	NA				NA	blood	0.10			0.10
			PCB-1254	7.E-05				7.E-05	eye	21.			21.
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	9.E-07				9.E-07	liver	0.064			0.064
			alpha-Chlordane	9.E-07				9.E-07	NA	0.062			0.062
			gamma-Chlordane	6.E-07				6.E-07	NA	0.039			0.039
			Potassium-40	3.E-08				3.E-08					
			Radium-226	9.E-09				9.E-09					
			Chemical Total					3.E-04					27
		Exposure Point Total						3.E-04					27
	Exposure Medium Total							3.E-04					27
Medium Total								3.E-04					27
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	27

TABLE 9.12.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach A											
			Copper	NA				NA	Gastrointestinal tract	0.018			0.018
			Iron	NA				NA	Gastrointestinal tract	0.086			0.086
			Manganese	NA				NA	CNS	0.0054			0.0054
			Mercury (methyl)	NA				NA	Neuropsychological	5.2			5.2
			Selenium	NA				NA	selenosis	0.37			0.37
			Strontium	NA				NA	bone	0.0019			0.0019
			Zinc	NA				NA	blood	0.11			0.11
			Chemical Total					0.E+00					6
		Exposure Point Total						0.E+00					6
	Exposure Medium Total							0.E+00					6
Medium Total								0.E+00					6
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	6

TABLE 9.13.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach B	Aluminum	NA		NA		NA	Neurological	0.0063		0.000033	0.0063
			Arsenic	3.E-05		2.E-07		3.E-05	skin	0.20		0.0010	0.20
			Barium	NA		NA		NA	Kidney	0.0067		0.000035	0.0067
			Boron	NA		NA		NA	weight	0.0031		0.000016	0.0031
			Chromium	NA		NA		NA	None	0.0046		0.000024	0.0046
			Copper	NA		NA		NA	Gastrointestinal tract	0.00086		0.0000045	0.00086
			Iron	NA		NA		NA	Gastrointestinal tract	0.0076		0.000039	0.0076
			Manganese	NA		NA		NA	CNS	0.077		0.00040	0.077
			Mercury	NA		NA		NA	autoimmune	0.017		0.000091	0.017
			Molybdenum	NA		NA		NA	blood	0.0055		0.000029	0.0055
			Nickel	NA		NA		NA	weight	0.00086		0.00000090	0.00086
			Selenium	NA		NA		NA	selenosis	0.0022		0.000012	0.0022
			Strontium	NA		NA		NA	bone	0.0053		0.000028	0.0053
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0093		0.000048	0.0093
			Thorium-230	4.E-07				4.E-07					
			Uranium-234	5.E-07				5.E-07					
			Uranium-238	4.E-07				4.E-07					
			Chemical Total					3.E-05					0.3
		Exposure Point Total						3.E-05					0.3
	Exposure Medium Total							3.E-05					0.3
Medium Total								3.E-05					0.3
Receptor Total							Receptor Risk Total	3.E-05				Receptor HI Total	0.3

TABLE 9.14.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach B	Aluminum	NA		NA		NA	Neurological	0.015		0.000097	0.015
			Arsenic	2.E-05		1.E-07		2.E-05	skin	0.47		0.0031	0.47
			Barium	NA		NA		NA	Kidney	0.016		0.00010	0.016
			Boron	NA		NA		NA	weight	0.0072		0.000047	0.0072
			Chromium	NA		NA		NA	None	0.011		0.000070	0.011
			Copper	NA		NA		NA	Gastrointestinal tract	0.0020		0.000013	0.0020
			Iron	NA		NA		NA	Gastrointestinal tract	0.018		0.00012	0.018
			Manganese	NA		NA		NA	CNS	0.18		0.0012	0.18
			Mercury	NA		NA		NA	autoimmune	0.040		0.00027	0.041
			Molybdenum	NA		NA		NA	blood	0.013		0.000085	0.013
			Nickel	NA		NA		NA	weight	0.0020		0.0000027	0.0020
			Selenium	NA		NA		NA	selenosis	0.0052		0.000034	0.0052
			Strontium	NA		NA		NA	bone	0.012		0.000082	0.012
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.022		0.00014	0.022
			Thorium-230	6.E-08				6.E-08					
			Uranium-234	6.E-08				6.E-08					
			Uranium-238	5.E-08				5.E-08					
			Chemical Total					2.E-05					0.8
		Exposure Point Total						2.E-05					0.8
	Exposure Medium Total							2.E-05					0.8
Medium Total								2.E-05					0.8
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.8

TABLE 9.15.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
easonally Exposed Sedime	easonally Exposed Sedime	Emory River Reach B	Aluminum	NA		NA		NA	Neurological	0.0041		NA	0.0041
			Antimony	NA		NA		NA	blood	0.0011		NA	0.0011
			Arsenic	3.E-06		4.E-06		7.E-06	skin	0.020		0.028	0.048
			Barium	NA		NA		NA	Kidney	0.00018		NA	0.00018
			Beryllium	NA		NA		NA	intestinal tract	0.00013		NA	0.00013
			Boron	NA		NA		NA	weight	0.000020		NA	0.000020
			Chromium	NA		NA		NA	None	0.0017		NA	0.0017
			Cobalt	NA		NA		NA	Thyroid	0.012		NA	0.012
			Copper	NA		NA		NA	Gastrointestinal tract	0.00010		NA	0.00010
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000028		NA	0.000028
			Manganese	NA		NA		NA	CNS	0.0019		NA	0.0019
			Mercury	NA		NA		NA	autoimmune	0.000049		NA	0.000049
			Nickel	NA		NA		NA	weight	0.00024		NA	0.00024
			Selenium	NA		NA		NA	selenosis	0.00014		NA	0.00014
			Strontium	NA		NA		NA	bone	0.000037		NA	0.000037
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0015		NA	0.0015
			Zinc	NA		NA		NA	blood	0.000036		NA	0.000036
			Iron	NA		NA		NA	Gastrointestinal tract	0.0072		NA	0.0072
			Acenaphthene	NA		NA		NA	liver	0.0000		0.000000035	0.000000041
			Anthracene	NA		NA		NA	None	0.000000013		0.000000078	0.000000091
			Benzo(a)anthracene	3.E-09		2.E-08		2.E-08	NA	NA		NA	NA
			Benzo(a)pyrene	3.E-08		2.E-07		2.E-07	NA	NA		NA	NA
			Benzo(b)fluoranthene	4.E-09		3.E-08		3.E-08	NA	NA		NA	NA
			Benzo(k)fluoranthene	3.E-10		2.E-09		2.E-09	NA	NA		NA	NA
			Chrysene	4.E-11		2.E-10		3.E-10	NA	NA		NA	NA
			Dibenz(a,h)anthracene	5.E-09		3.E-08		3.E-08	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000035		0.0000021	0.0000024
			Fluorene	NA		NA		NA	blood	0.000000019		0.00000011	0.00000013
			Indeno(1,2,3-cd)pyrene	1.E-09		8.E-09		9.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000056		0.00000026	0.00000031
			Phenanthrene	NA		NA		NA	NA	0.00000016		0.00000074	0.00000091
			Pyrene	NA		NA		NA	kidney	0.00000044		0.0000020	0.0000025

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			PCB-1254	4.E-10		3.E-09		3.E-09	eye	0.000030		0.00019	0.00022
			PCB-1260	7.E-10		4.E-09		5.E-09	NA	NA		NA	NA
			4,4'-DDT	7.E-11		NA		7.E-11	liver	0.0000012		NA	0.0000012
			beta-BHC	1.E-10		NA		1.E-10	NA	0.000000023		NA	0.000000023
			Heptachlor	2.E-10		NA		2.E-10	liver	0.00000021		NA	0.00000021
			Cesium-137	2.E-09			1.E-07	1.E-07					
			Potassium-40	3.E-07			6.E-06	6.E-06					
			Radium-226	3.E-07			5.E-06	5.E-06					
			Radium-228	7.E-07			6.E-06	6.E-06					
			Thorium-228	8.E-08			2.E-09	8.E-08					
			Thorium-230	9.E-08			6.E-10	9.E-08					
			Thorium-232	8.E-08			2.E-10	8.E-08					
			Thorium-234	3.E-08			8.E-08	1.E-07					
			Uranium-234	5.E-08			1.E-10	5.E-08					
			Uranium-235	7.E-09			1.E-08	2.E-08					
			Uranium-238	8.E-08			7.E-08	1.E-07					
			Chemical Total					3.E-05					0.08
		Exposure Point Total						3.E-05					0.08
	Exposure Medium Total							3.E-05					0.08
Medium Total								3.E-05					0.08
Surface Water	Surface Water	Emory River Reach B	Aluminum	NA		NA		NA	Neurological	0.000028		0.000010	0.000039
			Arsenic	1.E-07		5.E-08		2.E-07	skin	0.00090		0.00034	0.0012
			Barium	NA		NA		NA	Kidney	0.000030		0.00016	0.00019
			Boron	NA		NA		NA	weight	0.000014		0.0000050	0.000019
			Chromium	NA		NA		NA	None	0.000021		0.00057	0.00059
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000039		0.0000014	0.0000052
			Iron	NA		NA		NA	Gastrointestinal tract	0.000034		0.000012	0.000046
			Manganese	NA		NA		NA	CNS	0.00035		0.0031	0.0035
			Mercury	NA		NA		NA	autoimmune	0.000078		0.000035	0.00011
			Molybdenum	NA		NA		NA	blood	0.000025		0.0000090	0.000034
			Nickel	NA		NA		NA	weight	0.0000039		0.0000070	0.000011
			Selenium	NA		NA		NA	selenosis	0.0000100		0.0000045	0.000014
			Strontium	NA		NA		NA	bone	0.000024		0.0000086	0.000032
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000042		0.00058	0.00062
			Thorium-230	2.E-09				2.E-09					
			Uranium-234	2.E-09				2.E-09					
			Uranium-238	2.E-09				2.E-09					
			Chemical Total					2.E-07					0.006
Medium Total								2.E-07					0.006
Receptor Total							Receptor Risk Total	3.E-05				Receptor HI Total	0.08

TABLE 9.16.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
easonally Exposed Sedime	easonally Exposed Sedime	Emory River Reach B	Aluminum	NA		NA		NA	Neurological	0.0076		NA	0.0076
			Antimony	NA		NA		NA	blood	0.0020		NA	0.0020
			Arsenic	2.E-06		2.E-06		4.E-06	skin	0.037		0.027	0.064
			Barium	NA		NA		NA	Kidney	0.00034		NA	0.00034
			Beryllium	NA		NA		NA	intestinal tract	0.00025		NA	0.00025
			Boron	NA		NA		NA	weight	0.000036		NA	0.000036
			Chromium	NA		NA		NA	None	0.0032		NA	0.0032
			Cobalt	NA		NA		NA	Thyroid	0.022		NA	0.022
			Copper	NA		NA		NA	Gastrointestinal tract	0.00019		NA	0.00019
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000053		NA	0.000053
			Manganese	NA		NA		NA	CNS	0.0035		NA	0.0035
			Mercury	NA		NA		NA	autoimmune	0.000091		NA	0.000091
			Nickel	NA		NA		NA	weight	0.00045		NA	0.00045
			Selenium	NA		NA		NA	selenosis	0.00026		NA	0.00026
			Strontium	NA		NA		NA	bone	0.000070		NA	0.000070
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0028		NA	0.0028
			Zinc	NA		NA		NA	blood	0.000067		NA	0.000067
			Iron	NA		NA		NA	Gastrointestinal tract	0.013		NA	0.013
			Acenaphthene	NA		NA		NA	liver	0.000000011		0.000000034	0.000000045
			Anthracene	NA		NA		NA	None	0.000000025		0.000000075	0.000000099
			Benzo(a)anthracene	2.E-09		6.E-09		8.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	2.E-08		7.E-08		9.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	3.E-09		1.E-08		1.E-08	NA	NA		NA	NA
			Benzo(k)fluoranthene	2.E-10		7.E-10		9.E-10	NA	NA		NA	NA
			Chrysene	2.E-11		9.E-11		1.E-10	NA	NA		NA	NA
			Dibenz(a,h)anthracene	3.E-09		1.E-08		1.E-08	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000065		0.0000020	0.0000026
			Fluorene	NA		NA		NA	blood	0.000000036		0.00000011	0.00000015
			Indeno(1,2,3-cd)pyrene	9.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.00000011		0.00000025	0.00000035
			Phenanthrene	NA		NA		NA	NA	0.00000030		0.00000071	0.0000010
			Pyrene	NA		NA		NA	kidney	0.00000083		0.0000019	0.0000028

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			PCB-1254	3.E-10		1.E-09		1.E-09	eye	0.000056		0.00018	0.00024
			PCB-1260	4.E-10		2.E-09		2.E-09	NA	NA		NA	NA
			4,4'-DDT	5.E-11		NA		5.E-11	liver	0.0000023		NA	0.0000023
			beta-BHC	8.E-11		NA		8.E-11	NA	0.000000044		NA	0.000000044
			Heptachlor	1.E-10		NA		1.E-10	liver	0.00000039		NA	0.00000039
			Cesium-137	8.E-10			6.E-08	6.E-08					
			Potassium-40	1.E-07			2.E-06	3.E-06					
			Radium-226	1.E-07			2.E-06	2.E-06					
			Radium-228	3.E-07			2.E-06	3.E-06					
			Thorium-228	4.E-08			1.E-09	4.E-08					
			Thorium-230	4.E-08			2.E-10	5.E-08					
			Thorium-232	4.E-08			7.E-11	4.E-08					
			Thorium-234	2.E-08			3.E-08	5.E-08					
			Uranium-234	3.E-08			5.E-11	3.E-08					
			Uranium-235	3.E-09			5.E-09	8.E-09					
			Uranium-238	4.E-08			3.E-08	7.E-08					
			Chemical Total					1.E-05					0.1
		Exposure Point Total						1.E-05					0.1
	Exposure Medium Total							1.E-05					0.1
Medium Total								1.E-05					0.1
Surface Water	Surface Water	Emory River Reach B	Aluminum	NA		NA		NA	Neurological	0.000044		0.000013	0.000057
			Arsenic	9.E-08		3.E-08		1.E-07	skin	0.0014		0.00043	0.0018
			Barium	NA		NA		NA	Kidney	0.000047		0.00020	0.00024
			Boron	NA		NA		NA	weight	0.000022		0.0000063	0.000028
			Chromium	NA		NA		NA	None	0.000032		0.00072	0.00075
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000060		0.0000018	0.0000078
			Iron	NA		NA		NA	Gastrointestinal tract	0.000053		0.000016	0.000068
			Manganese	NA		NA		NA	CNS	0.00054		0.0040	0.0045
			Mercury	NA		NA		NA	autoimmune	0.00012		0.000045	0.00017
			Molybdenum	NA		NA		NA	blood	0.000039		0.000011	0.000050
			Nickel	NA		NA		NA	weight	0.0000060		0.0000088	0.000015
			Selenium	NA		NA		NA	selenosis	0.000016		0.0000057	0.000021
			Strontium	NA		NA		NA	bone	0.000037		0.000011	0.000048
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000065		0.00073	0.00080
			Thorium-230	8.E-10				8.E-10					
			Uranium-234	9.E-10				9.E-10					
			Uranium-238	7.E-10				7.E-10					
			Chemical Total					1.E-07					0.009
Medium Total								1.E-07					0.009
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.1

TABLE 9.17.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach B											
			Cobalt	NA				NA	Thyroid	0.040			0.040
			Copper	NA				NA	Gastrointestinal tract	0.059			0.059
			Manganese	NA				NA	CNS	0.0010			0.0010
			Mercury (methyl)	NA				NA	Neuropsychological	1.5			1.5
			Nickel	NA				NA	weight	0.028			0.028
			Selenium	NA				NA	selenosis	0.11			0.11
			Strontium	NA				NA	bone	0.00027			0.00027
			Zinc	NA				NA	blood	0.027			0.027
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	8.E-07				8.E-07	NA	NA			NA
			Potassium-40	1.E-07				1.E-07					
			Radium-226	2.E-08				2.E-08					
			Chemical Total					1.E-04					2
		Exposure Point Total						1.E-04					2
	Exposure Medium Total							1.E-04					2
Medium Total								1.E-04					2
Receptor Total							Receptor Risk Total	1.E-04				Receptor HI Total	2

TABLE 9.18.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach B											
			Barium	NA				NA	Kidney	0.00047			0.00047
			Chromium	NA				NA	None	0.037			0.037
			Cobalt	NA				NA	Thyroid	0.039			0.039
			Copper	NA				NA	Gastrointestinal tract	0.0061			0.0061
			Manganese	NA				NA	CNS	0.0039			0.0039
			Mercury (methyl)	NA				NA	Neuropsychological	0.78			0.78
			Nickel	NA				NA	weight	0.0065			0.0065
			Selenium	NA				NA	selenosis	0.13			0.13
			Strontium	NA				NA	bone	0.0017			0.0017
			Zinc	NA				NA	blood	0.033			0.033
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.19.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach B											
			Barium	NA				NA	Kidney	0.00036			0.00036
			Cobalt	NA				NA	Thyroid	0.062			0.062
			Copper	NA				NA	Gastrointestinal tract	0.0089			0.0089
			Manganese	NA				NA	CNS	0.0028			0.0028
			Mercury (methyl)	NA				NA	Neuropsychological	1.0			1.0
			Nickel	NA				NA	weight	0.0037			0.0037
			Selenium	NA				NA	selenosis	0.060			0.060
			Strontium	NA				NA	bone	0.00080			0.00080
			Zinc	NA				NA	blood	0.017			0.017
			PCB-1254	6.E-05				6.E-05	eye	3.6			3.6
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			4,4'-DDE	1.E-06				1.E-06	NA	NA			NA
			4,4'-DDT	9.E-07				9.E-07	liver	0.012			0.012
			alpha-Chlordane	5.E-07				5.E-07	NA	0.0072			0.0072
			Potassium-40	2.E-08				2.E-08					
			Radium-226	7.E-09				7.E-09					
			Chemical Total					3.E-04					5
		Exposure Point Total						3.E-04					5
	Exposure Medium Total							3.E-04					5
Medium Total								3.E-04					5
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	5

TABLE 9.20.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach B											
			Copper	NA				NA	Gastrointestinal tract	0.049			0.049
			Mercury (methyl)	NA				NA	Neuropsychological	1.6			1.6
			Nickel	NA				NA	weight	0.019			0.019
			Selenium	NA				NA	selenosis	0.094			0.094
			Strontium	NA				NA	bone	0.00028			0.00028
			Zinc	NA				NA	blood	0.022			0.022
			Chemical Total					0.E+00					2
		Exposure Point Total						0.E+00					2
	Exposure Medium Total							0.E+00					2
Medium Total								0.E+00					2
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	2

TABLE 9.21.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach B											
			Cobalt	NA				NA	Thyroid	0.19			0.19
			Copper	NA				NA	Gastrointestinal tract	0.28			0.28
			Manganese	NA				NA	CNS	0.0049			0.0049
			Mercury (methyl)	NA				NA	Neuropsychological	6.8			6.8
			Nickel	NA				NA	weight	0.13			0.13
			Selenium	NA				NA	selenosis	0.53			0.53
			Strontium	NA				NA	bone	0.0013			0.0013
			Zinc	NA				NA	blood	0.13			0.13
			PCB-1260	9.E-05				9.E-05	NA	NA			NA
			4,4'-DDE	7.E-07				7.E-07	NA	NA			NA
			Potassium-40	3.E-08				3.E-08					
			Radium-226	5.E-09				5.E-09					
			Chemical Total					9.E-05					8
		Exposure Point Total						9.E-05					8
	Exposure Medium Total							9.E-05					8
Medium Total								9.E-05					8
Receptor Total							Receptor Risk Total	9.E-05				Receptor HI Total	8

TABLE 9.22.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach B											
			Barium	NA				NA	Kidney	0.0022			0.0022
			Chromium	NA				NA	None	0.17			0.17
			Cobalt	NA				NA	Thyroid	0.18			0.18
			Copper	NA				NA	Gastrointestinal tract	0.029			0.029
			Manganese	NA				NA	CNS	0.018			0.018
			Mercury (methyl)	NA				NA	Neuropsychological	3.6			3.6
			Nickel	NA				NA	weight	0.030			0.030
			Selenium	NA				NA	selenosis	0.61			0.61
			Strontium	NA				NA	bone	0.0081			0.0081
			Zinc	NA				NA	blood	0.15			0.15
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 9.23.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach B											
			Barium	NA				NA	Kidney	0.0017			0.0017
			Cobalt	NA				NA	Thyroid	0.29			0.29
			Copper	NA				NA	Gastrointestinal tract	0.042			0.042
			Manganese	NA				NA	CNS	0.013			0.013
			Mercury (methyl)	NA				NA	Neuropsychological	4.9			4.9
			Nickel	NA				NA	weight	0.017			0.017
			Selenium	NA				NA	selenosis	0.28			0.28
			Strontium	NA				NA	bone	0.0037			0.0037
			Zinc	NA				NA	blood	0.079			0.079
			PCB-1254	6.E-05				6.E-05	eye	17.			17.
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			4,4'-DDE	1.E-06				1.E-06	NA	NA			NA
			4,4'-DDT	8.E-07				8.E-07	liver	0.058			0.058
			alpha-Chlordane	5.E-07				5.E-07	NA	0.034			0.034
			Potassium-40	2.E-08				2.E-08					
			Radium-226	7.E-09				7.E-09					
			Chemical Total					2.E-04					22
		Exposure Point Total						2.E-04					22
	Exposure Medium Total							2.E-04					22
Medium Total								2.E-04					22
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	22

TABLE 9.24.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach B											
			Copper	NA				NA	Gastrointestinal tract	0.23			0.23
			Mercury (methyl)	NA				NA	Neuropsychological	7.6			7.6
			Nickel	NA				NA	weight	0.088			0.088
			Selenium	NA				NA	selenosis	0.44			0.44
			Strontium	NA				NA	bone	0.0013			0.0013
			Zinc	NA				NA	blood	0.10			0.10
			Chemical Total					0.E+00					8
		Exposure Point Total						0.E+00					8
	Exposure Medium Total							0.E+00					8
Medium Total								0.E+00					8
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	8

TABLE 9.25.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach C	Aluminum	NA		NA		NA	Neurological	0.0060		0.000031	0.0060
			Arsenic	3.E-05		2.E-07		3.E-05	skin	0.21		0.0011	0.21
			Barium	NA		NA		NA	Kidney	0.0074		0.000038	0.0074
			Boron	NA		NA		NA	weight	0.0030		0.000015	0.0030
			Chromium	NA		NA		NA	None	0.0043		0.000022	0.0043
			Cobalt	NA		NA		NA	Thyroid	0.042		0.00022	0.042
			Copper	NA		NA		NA	Gastrointestinal tract	0.00062		0.0000032	0.00062
			Iron	NA		NA		NA	Gastrointestinal tract	0.0089		0.000046	0.0089
			Manganese	NA		NA		NA	CNS	0.20		0.0011	0.20
			Molybdenum	NA		NA		NA	blood	0.0054		0.000028	0.0054
			Nickel	NA		NA		NA	weight	0.00095		0.00000099	0.00095
			Strontium	NA		NA		NA	bone	0.0051		0.000026	0.0051
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0084		0.000044	0.0084
			Radium-228	1.E-04				1.E-04					
			Uranium-234	7.E-07				7.E-07					
			Uranium-238	9.E-07				9.E-07					
			Chemical Total					2.E-04					0.5
		Exposure Point Total						2.E-04					0.5
	Exposure Medium Total							2.E-04					0.5
Medium Total								2.E-04					0.5
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	0.5

TABLE 9.26.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach C	Aluminum	NA		NA		NA	Neurological	0.014		0.000092	0.014
			Arsenic	2.E-05		1.E-07		2.E-05	skin	0.48		0.0032	0.49
			Barium	NA		NA		NA	Kidney	0.017		0.00011	0.017
			Boron	NA		NA		NA	weight	0.0069		0.000046	0.0069
			Chromium	NA		NA		NA	None	0.010		0.000066	0.010
			Cobalt	NA		NA		NA	Thyroid	0.098		0.00065	0.099
			Copper	NA		NA		NA	Gastrointestinal tract	0.0014		0.0000095	0.0014
			Iron	NA		NA		NA	Gastrointestinal tract	0.021		0.00014	0.021
			Manganese	NA		NA		NA	CNS	0.47		0.0031	0.47
			Molybdenum	NA		NA		NA	blood	0.013		0.000083	0.013
			Nickel	NA		NA		NA	weight	0.0022		0.0000029	0.0022
			Strontium	NA		NA		NA	bone	0.012		0.000078	0.012
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.020		0.00013	0.020
			Radium-228	2.E-05				2.E-05					
			Uranium-234	8.E-08				8.E-08					
			Uranium-238	1.E-07				1.E-07					
			Chemical Total					4.E-05					1
		Exposure Point Total						4.E-05					1
	Exposure Medium Total							4.E-05					1
Medium Total								4.E-05					1
Receptor Total							Receptor Risk Total	4.E-05				Receptor HI Total	1

TABLE 9.27.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
easonally Exposed Sedime	easonally Exposed Sedimer	Emory River Reach C	Aluminum	NA		NA		NA	Neurological	0.0031		NA	0.0031
			Arsenic	3.E-07		5.E-07		8.E-07	skin	0.0021		0.0030	0.0050
			Barium	NA		NA		NA	Kidney	0.00022		NA	0.00022
			Beryllium	NA		NA		NA	intestinal tract	0.00010		NA	0.00010
			Boron	NA		NA		NA	weight	0.0000097		NA	0.0000097
			Chromium	NA		NA		NA	None	0.0010		NA	0.0010
			Cobalt	NA		NA		NA	Thyroid	0.0069		NA	0.0069
			Copper	NA		NA		NA	Gastrointestinal tract	0.000038		NA	0.000038
			Manganese	NA		NA		NA	CNS	0.0018		NA	0.0018
			Nickel	NA		NA		NA	weight	0.00012		NA	0.00012
			Strontium	NA		NA		NA	bone	0.0000062		NA	0.0000062
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.00073		NA	0.00073
			Zinc	NA		NA		NA	blood	0.000031		NA	0.000031
			Iron	NA		NA		NA	Gastrointestinal tract	0.0051		NA	0.0051
			Anthracene	NA		NA		NA	None	0.0000000014		0.0000000082	0.0000000095
			Benzo(a)anthracene	9.E-10		5.E-09		6.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	1.E-08		6.E-08		7.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	2.E-09		1.E-08		1.E-08	NA	NA		NA	NA
			Benzo(k)fluoranthene	1.E-10		6.E-10		7.E-10	NA	NA		NA	NA
			Chrysene	1.E-11		8.E-11		9.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	1.E-09		9.E-09		1.E-08	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000023		0.0000014	0.0000016
			Fluorene	NA		NA		NA	blood	0.000000011		0.000000067	0.000000078
			Indeno(1,2,3-cd)pyrene	5.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000083		0.00000038	0.00000046
			Phenanthrene	NA		NA		NA	NA	0.00000016		0.00000071	0.00000087
			Pyrene	NA		NA		NA	kidney	0.00000026		0.0000012	0.0000014
			PCB-1254	4.E-10		2.E-09		3.E-09	eye	0.000027		0.00017	0.00020
			PCB-1260	5.E-10		3.E-09		4.E-09	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Cesium-137	2.E-10			2.E-08	2.E-08					
			Potassium-40	5.E-08			1.E-06	1.E-06					
			Radium-226	7.E-08			1.E-06	1.E-06					
			Radium-228	3.E-07			2.E-06	2.E-06					
			Thorium-228	3.E-08			8.E-10	3.E-08					
			Thorium-230	1.E-07			7.E-10	1.E-07					
			Thorium-232	2.E-08			5.E-11	2.E-08					
			Thorium-234	2.E-08			4.E-08	6.E-08					
			Uranium-234	1.E-08			4.E-11	1.E-08					
			Uranium-235	9.E-10			5.E-09	6.E-09					
			Uranium-238	2.E-08			2.E-08	3.E-08					
			Chemical Total					6.E-06					0.02
		Exposure Point Total						6.E-06					0.02
	Exposure Medium Total							6.E-06					0.02
Medium Total								6.E-06					0.02
Surface Water	Surface Water	Emory River Reach C	Aluminum	NA		NA		NA	Neurological	0.000027		0.0000097	0.000037
			Arsenic	1.E-07		5.E-08		2.E-07	skin	0.00093		0.00035	0.0013
			Barium	NA		NA		NA	Kidney	0.000033		0.00017	0.00020
			Boron	NA		NA		NA	weight	0.000013		0.0000048	0.000018
			Chromium	NA		NA		NA	None	0.000019		0.00053	0.00055
			Cobalt	NA		NA		NA	Thyroid	0.00019		0.00014	0.00033
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000028		0.00000100	0.0000038
			Iron	NA		NA		NA	Gastrointestinal tract	0.000040		0.000014	0.000054
			Manganese	NA		NA		NA	CNS	0.00091		0.0082	0.0091
			Molybdenum	NA		NA		NA	blood	0.000024		0.0000088	0.000033
			Nickel	NA		NA		NA	weight	0.0000043		0.0000077	0.000012
			Strontium	NA		NA		NA	bone	0.000023		0.0000082	0.000031
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000038		0.00052	0.00056
			Radium-228	7.E-07				7.E-07					
			Uranium-234	3.E-09				3.E-09					
			Uranium-238	4.E-09				4.E-09					
			Chemical Total					9.E-07					0.01
		Exposure Point Total						9.E-07					0.01
	Exposure Medium Total							9.E-07					0.01
Medium Total								9.E-07					0.01
Receptor Total							Receptor Risk Total	7.E-06				Receptor HI Total	0.04

TABLE 9.28.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
easonally Exposed Sedime	easonally Exposed Sedimer	Emory River Reach C	Aluminum	NA		NA		NA	Neurological	0.0057		NA	0.0057
			Arsenic	2.E-07		2.E-07		4.E-07	skin	0.0038		0.0028	0.0067
			Barium	NA		NA		NA	Kidney	0.00042		NA	0.00042
			Beryllium	NA		NA		NA	intestinal tract	0.00019		NA	0.00019
			Boron	NA		NA		NA	weight	0.000018		NA	0.000018
			Chromium	NA		NA		NA	None	0.0019		NA	0.0019
			Cobalt	NA		NA		NA	Thyroid	0.013		NA	0.013
			Copper	NA		NA		NA	Gastrointestinal tract	0.000070		NA	0.000070
			Manganese	NA		NA		NA	CNS	0.0034		NA	0.0034
			Nickel	NA		NA		NA	weight	0.00022		NA	0.00022
			Strontium	NA		NA		NA	bone	0.000012		NA	0.000012
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0014		NA	0.0014
			Zinc	NA		NA		NA	blood	0.000059		NA	0.000059
			Iron	NA		NA		NA	Gastrointestinal tract	0.0096		NA	0.0096
			Anthracene	NA		NA		NA	None	0.0000000026		0.0000000078	0.000000010
			Benzo(a)anthracene	6.E-10		2.E-09		3.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	6.E-09		2.E-08		3.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	1.E-09		4.E-09		5.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	7.E-11		3.E-10		3.E-10	NA	NA		NA	NA
			Chrysene	8.E-12		3.E-11		4.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	9.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000043		0.0000013	0.0000017
			Fluorene	NA		NA		NA	blood	0.000000021		0.000000064	0.000000085
			Indeno(1,2,3-cd)pyrene	3.E-10		1.E-09		2.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.00000015		0.00000036	0.00000052
			Phenanthrene	NA		NA		NA	NA	0.00000029		0.00000069	0.00000098
			Pyrene	NA		NA		NA	kidney	0.00000048		0.0000011	0.0000016
			PCB-1254	2.E-10		1.E-09		1.E-09	eye	0.000051		0.00017	0.00022
			PCB-1260	3.E-10		1.E-09		2.E-09	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Cesium-137	1.E-10			9.E-09	9.E-09					
			Potassium-40	2.E-08			4.E-07	4.E-07					
			Radium-226	4.E-08			6.E-07	6.E-07					
			Radium-228	1.E-07			9.E-07	1.E-06					
			Thorium-228	1.E-08			3.E-10	1.E-08					
			Thorium-230	6.E-08			3.E-10	6.E-08					
			Thorium-232	1.E-08			2.E-11	1.E-08					
			Thorium-234	9.E-09			2.E-08	3.E-08					
			Uranium-234	7.E-09			2.E-11	7.E-09					
			Uranium-235	5.E-10			2.E-09	2.E-09					
			Uranium-238	9.E-09			6.E-09	2.E-08					
			Chemical Total					3.E-06					0.04
		Exposure Point Total						3.E-06					0.04
	Exposure Medium Total							3.E-06					0.04
Medium Total								3.E-06					0.04
Surface Water	Surface Water	Emory River Reach C	Aluminum	NA		NA		NA	Neurological	0.000042		0.000012	0.000054
			Arsenic	9.E-08		3.E-08		1.E-07	skin	0.0015		0.00045	0.0019
			Barium	NA		NA		NA	Kidney	0.000051		0.00022	0.00027
			Boron	NA		NA		NA	weight	0.000021		0.0000061	0.000027
			Chromium	NA		NA		NA	None	0.000030		0.00068	0.00071
			Cobalt	NA		NA		NA	Thyroid	0.00029		0.000086	0.00038
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000043		0.0000013	0.0000056
			Iron	NA		NA		NA	Gastrointestinal tract	0.000062		0.000018	0.000080
			Manganese	NA		NA		NA	CNS	0.0014		0.010	0.012
			Molybdenum	NA		NA		NA	blood	0.000038		0.000011	0.000049
			Nickel	NA		NA		NA	weight	0.0000067		0.0000098	0.000016
			Strontium	NA		NA		NA	bone	0.000035		0.000010	0.000046
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000059		0.00066	0.00072
			Radium-228	3.E-07				3.E-07					
			Uranium-234	1.E-09				1.E-09					
			Uranium-238	2.E-09				2.E-09					
			Chemical Total					4.E-07					0.02
		Exposure Point Total						4.E-07					0.02
	Exposure Medium Total							4.E-07					0.02
Medium Total								4.E-07					0.02
Receptor Total							Receptor Risk Total	3.E-06				Receptor HI Total	0.06

TABLE 9.29.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach C											
			Barium	NA				NA	Kidney	0.00040			0.00040
			Chromium	NA				NA	None	0.035			0.035
			Copper	NA				NA	Gastrointestinal tract	0.054			0.054
			Manganese	NA				NA	CNS	0.0022			0.0022
			Mercury (methyl)	NA				NA	Neurophysiological	1.7			1.7
			Nickel	NA				NA	weight	0.0094			0.0094
			Selenium	NA				NA	selenosis	0.095			0.095
			Strontium	NA				NA	bone	0.0024			0.0024
			Zinc	NA				NA	blood	0.029			0.029
			PCB-1254	1.E-04				1.E-04	eye	7.9			7.9
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.020			0.020
			alpha-Chlordane	1.E-06				1.E-06	NA	0.014			0.014
			Heptachlor	6.E-06				6.E-06	liver	0.0059			0.0059
			Chemical Total					5.E-04					10
		Exposure Point Total						5.E-04					10
	Exposure Medium Total							5.E-04					10
Medium Total								5.E-04					10
Receptor Total							Receptor Risk Total	5.E-04				Receptor HI Total	10

TABLE 9.30.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach C											
			Aluminum	NA				NA	Neurological	0.0052			0.0052
			Barium	NA				NA	Kidney	0.00082			0.00082
			Cobalt	NA				NA	Thyroid	0.054			0.054
			Copper	NA				NA	Gastrointestinal tract	0.0060			0.0060
			Iron	NA				NA	Gastrointestinal tract	0.013			0.013
			Manganese	NA				NA	CNS	0.013			0.013
			Mercury (methyl)	NA				NA	Neurophysiological	0.54			0.54
			Selenium	NA				NA	selenosis	0.091			0.091
			Strontium	NA				NA	bone	0.0024			0.0024
			Zinc	NA				NA	blood	0.036			0.036
			Chemical Total					0.E+00					0.8
		Exposure Point Total						0.E+00					0.8
	Exposure Medium Total							0.E+00					0.8
Medium Total								0.E+00					0.8
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	0.8

TABLE 9.31.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach C											
			Barium	NA				NA	Kidney	0.0012			0.0012
			Cobalt	NA				NA	Thyroid	0.086			0.086
			Copper	NA				NA	Gastrointestinal tract	0.019			0.019
			Manganese	NA				NA	CNS	0.013			0.013
			Mercury (methyl)	NA				NA	Neurophysiological	1.7			1.7
			Nickel	NA				NA	weight	0.0095			0.0095
			Selenium	NA				NA	selenosis	0.040			0.040
			Strontium	NA				NA	bone	0.0025			0.0025
			Zinc	NA				NA	blood	0.022			0.022
			PCB-1260	7.E-04				7.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.030			0.030
			alpha-Chlordane	3.E-07				3.E-07	NA	0.0046			0.0046
			Chemical Total					7.E-04					2.0
		Exposure Point Total						7.E-04					2.0
	Exposure Medium Total							7.E-04					2.0
Medium Total								7.E-04					2.0
Receptor Total							Receptor Risk Total	7.E-04				Receptor HI Total	2.0

TABLE 9.32.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach C											
			Barium	NA				NA	Kidney	0.0019			0.0019
			Chromium	NA				NA	None	0.16			0.16
			Copper	NA				NA	Gastrointestinal tract	0.25			0.25
			Manganese	NA				NA	CNS	0.010			0.010
			Mercury (methyl)	NA				NA	Neurophysiological	7.7			7.7
			Nickel	NA				NA	weight	0.044			0.044
			Selenium	NA				NA	selenosis	0.44			0.44
			Strontium	NA				NA	bone	0.011			0.011
			Zinc	NA				NA	blood	0.13			0.13
			PCB-1254	1.E-04				1.E-04	eye	37.			37.
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.093			0.093
			alpha-Chlordane	1.E-06				1.E-06	NA	0.065			0.065
			Heptachlor	5.E-06				5.E-06	liver	0.028			0.028
			Chemical Total					4.E-04					46
		Exposure Point Total						4.E-04					46
	Exposure Medium Total							4.E-04					46
Medium Total								4.E-04					46
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	46

TABLE 9.33.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach C											
			Aluminum	NA				NA	Neurological	0.024			0.024
			Barium	NA				NA	Kidney	0.0038			0.0038
			Cobalt	NA				NA	Thyroid	0.25			0.25
			Copper	NA				NA	Gastrointestinal tract	0.028			0.028
			Iron	NA				NA	Gastrointestinal tract	0.062			0.062
			Manganese	NA				NA	CNS	0.061			0.061
			Mercury (methyl)	NA				NA	Neurophysiological	2.5			2.5
			Selenium	NA				NA	selenosis	0.42			0.42
			Strontium	NA				NA	bone	0.011			0.011
			Zinc	NA				NA	blood	0.17			0.17
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 9.34.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach C											
			Barium	NA				NA	Kidney	0.0058			0.0058
			Cobalt	NA				NA	Thyroid	0.40			0.40
			Copper	NA				NA	Gastrointestinal tract	0.090			0.090
			Manganese	NA				NA	CNS	0.060			0.060
			Mercury (methyl)	NA				NA	Neurophysiological	8.1			8.1
			Nickel	NA				NA	weight	0.044			0.044
			Selenium	NA				NA	selenosis	0.19			0.19
			Strontium	NA				NA	bone	0.012			0.012
			Zinc	NA				NA	blood	0.10			0.10
			PCB-1260	7.E-04				7.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.14			0.14
			alpha-Chlordane	3.E-07				3.E-07	NA	0.021			0.021
			Chemical Total					7.E-04					9
		Exposure Point Total						7.E-04					9
	Exposure Medium Total							7.E-04					9
Medium Total								7.E-04					9
Receptor Total							Receptor Risk Total	7.E-04				Receptor HI Total	9

TABLE 9.35.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Off-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reference Reach	Arsenic	1.E-05		7.E-08		1.E-05	skin	0.081		0.00043	0.082
			Barium	NA		NA		NA	Kidney	0.0069		0.000036	0.0070
			Boron	NA		NA		NA	weight	0.0026		0.000014	0.0026
			Chromium	NA		NA		NA	None	0.0037		0.000020	0.0038
			Copper	NA		NA		NA	Gastrointestinal tract	0.00034		0.0000018	0.00035
			Iron	NA		NA		NA	Gastrointestinal tract	0.0041		0.000022	0.0042
			Manganese	NA		NA		NA	CNS	0.15		0.00076	0.15
			Mercury	NA		NA		NA	autoimmune	0.016		0.000081	0.016
			Nickel	NA		NA		NA	weight	0.00083		0.00000087	0.00083
			Selenium	NA		NA		NA	selenosis	0.0021		0.000011	0.0021
			Strontium	NA		NA		NA	bone	0.0047		0.000024	0.0047
			Uranium-238	5.E-07				5.E-07					
			Chemical Total					1.E-05					0.3
		Exposure Point Total						1.E-05					0.3
	Exposure Medium Total							1.E-05					0.3
Medium Total								1.E-05					0.3
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.3

TABLE 9.36.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Off-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reference Reach	Arsenic	7.E-06		5.E-08		7.E-06	skin	0.19		0.0013	0.19
			Barium	NA		NA		NA	Kidney	0.016		0.00011	0.016
			Boron	NA		NA		NA	weight	0.0060		0.000040	0.0061
			Chromium	NA		NA		NA	None	0.0087		0.000058	0.0088
			Copper	NA		NA		NA	Gastrointestinal tract	0.00080		0.0000053	0.00081
			Iron	NA		NA		NA	Gastrointestinal tract	0.0097		0.000064	0.0097
			Manganese	NA		NA		NA	CNS	0.34		0.0023	0.34
			Mercury	NA		NA		NA	autoimmune	0.036		0.00024	0.036
			Nickel	NA		NA		NA	weight	0.0019		0.0000026	0.0019
			Selenium	NA		NA		NA	selenosis	0.0049		0.000032	0.0049
			Strontium	NA		NA		NA	bone	0.011		0.000072	0.011
			Uranium-238	6.E-08				6.E-08					
			Chemical Total					7.E-06					0.6
		Exposure Point Total						7.E-06					0.6
	Exposure Medium Total							7.E-06					0.6
Medium Total								7.E-06					0.6
Receptor Total							Receptor Risk Total	7.E-06				Receptor HI Total	0.6

TABLE 9.37.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.0028		NA	0.0028
			Arsenic	5.E-07		8.E-07		1.E-06	skin	0.0034		0.0049	0.0083
			Barium	NA		NA		NA	Kidney	0.000085		NA	0.000085
			Beryllium	NA		NA		NA	intestinal tract	0.000072		NA	0.000072
			Chromium	NA		NA		NA	None	0.00086		NA	0.00086
			Cobalt	NA		NA		NA	Thyroid	0.0066		NA	0.0066
			Copper	NA		NA		NA	Gastrointestinal tract	0.000032		NA	0.000032
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000023		NA	0.000023
			Manganese	NA		NA		NA	CNS	0.00092		NA	0.00092
			Strontium	NA		NA		NA	bone	0.0000051		NA	0.0000051
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.00099		NA	0.00099
			Zinc	NA		NA		NA	blood	0.000034		NA	0.000034
			Iron	NA		NA		NA	Gastrointestinal tract	0.0050		NA	0.0050
			Anthracene	NA		NA		NA	None	0.0000		0.0000	0.0000
			Benzo(a)anthracene	8.E-10		4.E-09		5.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	8.E-09		4.E-08		5.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	1.E-09		8.E-09		9.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	8.E-11		5.E-10		6.E-10	NA	NA		NA	NA
			Chrysene	9.E-12		5.E-11		6.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	1.E-09		6.E-09		7.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000016		0.00000095	0.0000011
			Fluorene	NA		NA		NA	blood	0.000000010		0.000000061	0.000000072
			Indeno(1,2,3-cd)pyrene	3.E-10		2.E-09		2.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000037		0.00000017	0.00000020
			Phenanthrene	NA		NA		NA	NA	0.00000011		0.00000049	0.00000059
			Pyrene	NA		NA		NA	kidney	0.00000021		0.00000094	0.0000011
			PCB-1254	4.E-10		3.E-09		3.E-09	eye	0.000030		0.00019	0.00022
			PCB-1260	6.E-10		4.E-09		4.E-09	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			beta-BHC	8.E-11		NA		8.E-11	NA	0.000000017		NA	0.000000017
			Cesium-137	2.E-10			2.E-08	2.E-08					
			Potassium-40	3.E-08			7.E-07	7.E-07					
			Radium-226	5.E-08			1.E-06	1.E-06					
			Radium-228	2.E-07			2.E-06	2.E-06					
			Thorium-228	3.E-08			8.E-10	3.E-08					
			Thorium-230	1.E-08			7.E-11	1.E-08					
			Thorium-232	2.E-08			4.E-11	2.E-08					
			Thorium-234	9.E-09			2.E-08	3.E-08					
			Uranium-234	8.E-09			2.E-11	9.E-09					
			Uranium-235	1.E-09			6.E-09	7.E-09					
			Uranium-238	1.E-08			1.E-08	2.E-08					
			Chemical Total					5.E-06					0.03
		Exposure Point Total						5.E-06					0.03
	Exposure Medium Total							5.E-06					0.03
Medium Total								5.E-06					0.03
Surface Water	Surface Water	Emory River Reference Reach	Arsenic	6.E-08		2.E-08		8.E-08	skin	0.00037		0.00014	0.00051
			Barium	NA		NA		NA	Kidney	0.000031		0.00016	0.00019
			Boron	NA		NA		NA	weight	0.000012		0.0000042	0.000016
			Chromium	NA		NA		NA	None	0.000017		0.00047	0.00048
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000015		0.00000056	0.0000021
			Iron	NA		NA		NA	Gastrointestinal tract	0.000019		0.0000067	0.000025
			Manganese	NA		NA		NA	CNS	0.00066		0.0059	0.0066
			Mercury	NA		NA		NA	autoimmune	0.000070		0.000031	0.00010
			Nickel	NA		NA		NA	weight	0.0000037		0.0000067	0.000010
			Selenium	NA		NA		NA	selenosis	0.0000094		0.0000042	0.000014
			Strontium	NA		NA		NA	bone	0.000021		0.0000075	0.000029
			Uranium-238	2.E-09				2.E-09					
			Chemical Total					8.E-08					0.008
Medium Total								8.E-08					0.008
Receptor Total							Receptor Risk Total	5.E-06				Receptor HI Total	0.03

TABLE 9.38.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Emory River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.0052		NA	0.0052
			Arsenic	3.E-07		3.E-07		6.E-07	skin	0.0063		0.0047	0.011
			Barium	NA		NA		NA	Kidney	0.00016		NA	0.00016
			Beryllium	NA		NA		NA	intestinal tract	0.00013		NA	0.00013
			Chromium	NA		NA		NA	None	0.0016		NA	0.0016
			Cobalt	NA		NA		NA	Thyroid	0.012		NA	0.012
			Copper	NA		NA		NA	Gastrointestinal tract	0.000060		NA	0.000060
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000043		NA	0.000043
			Manganese	NA		NA		NA	CNS	0.0017		NA	0.0017
			Strontium	NA		NA		NA	bone	0.0000095		NA	0.0000095
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0018		NA	0.0018
			Zinc	NA		NA		NA	blood	0.000063		NA	0.000063
			Iron	NA		NA		NA	Gastrointestinal tract	0.0093		NA	0.0093
			Anthracene	NA		NA		NA	None	0.0000		0.0000	0.000000011
			Benzo(a)anthracene	5.E-10		2.E-09		2.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	5.E-09		2.E-08		2.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	9.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	5.E-11		2.E-10		2.E-10	NA	NA		NA	NA
			Chrysene	6.E-12		2.E-11		3.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	7.E-10		2.E-09		3.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000030		0.00000091	0.0000012
			Fluorene	NA		NA		NA	blood	0.000000019		0.000000059	0.000000078
			Indeno(1,2,3-cd)pyrene	2.E-10		8.E-10		1.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000068		0.00000016	0.00000023
			Phenanthrene	NA		NA		NA	NA	0.00000020		0.00000047	0.00000067
			Pyrene	NA		NA		NA	kidney	0.00000039		0.00000091	0.0000013
			PCB-1254	3.E-10		1.E-09		1.E-09	eye	0.000056		0.00018	0.00024
			PCB-1260	4.E-10		2.E-09		2.E-09	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			beta-BHC	5.E-11		NA		5.E-11	NA	0.000000032		NA	0.000000032
			Cesium-137	1.E-10			9.E-09	9.E-09					
			Potassium-40	2.E-08			3.E-07	3.E-07					
			Radium-226	3.E-08			4.E-07	4.E-07					
			Radium-228	9.E-08			6.E-07	7.E-07					
			Thorium-228	1.E-08			3.E-10	1.E-08					
			Thorium-230	6.E-09			3.E-11	6.E-09					
			Thorium-232	9.E-09			2.E-11	9.E-09					
			Thorium-234	5.E-09			1.E-08	1.E-08					
			Uranium-234	4.E-09			9.E-12	4.E-09					
			Uranium-235	6.E-10			2.E-09	3.E-09					
			Uranium-238	6.E-09			4.E-09	1.E-08					
			Chemical Total					2.E-06					0.04
		Exposure Point Total						2.E-06					0.04
	Exposure Medium Total							2.E-06					0.04
Medium Total								2.E-06					0.04
Surface Water	Surface Water	Emory River Reference Reach	Arsenic	4.E-08		1.E-08		5.E-08	skin	0.00057		0.00018	0.00075
			Barium	NA		NA		NA	Kidney	0.000048		0.00020	0.00025
			Boron	NA		NA		NA	weight	0.000018		0.0000053	0.000023
			Chromium	NA		NA		NA	None	0.000026		0.00059	0.00062
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000024		0.00000071	0.0000031
			Iron	NA		NA		NA	Gastrointestinal tract	0.000029		0.0000085	0.000038
			Manganese	NA		NA		NA	CNS	0.0010		0.0075	0.0085
			Mercury	NA		NA		NA	autoimmune	0.00011		0.000040	0.00015
			Nickel	NA		NA		NA	weight	0.0000058		0.0000085	0.000014
			Selenium	NA		NA		NA	selenosis	0.000015		0.0000053	0.000020
			Strontium	NA		NA		NA	bone	0.000033		0.0000096	0.000042
			Uranium-238	1.E-09				1.E-09					
			Chemical Total					5.E-08					0.01
Medium Total								5.E-08					0.01
Receptor Total							Receptor Risk Total	2.E-06				Receptor HI Total	0.05

TABLE 9.39.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reference Reach											
			Copper	NA				NA	Gastrointestinal tract	0.0065			0.0065
			Manganese	NA				NA	CNS	0.0011			0.0011
			Mercury (methyl)	NA				NA	Neurophysiological	1.9			1.9
			Selenium	NA				NA	selenosis	0.074			0.074
			Strontium	NA				NA	bone	0.00030			0.00030
			Zinc	NA				NA	blood	0.027			0.027
			PCB-1260	7.E-05				7.E-05	NA	NA			NA
			Radium-226	3.E-08				3.E-08					
			Chemical Total					7.E-05					2
		Exposure Point Total						7.E-05					2
	Exposure Medium Total							7.E-05					2
Medium Total								7.E-05					2
Receptor Total							Receptor Risk Total	7.E-05				Receptor HI Total	2

TABLE 9.40.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reference Reach	Barium	NA				NA	Kidney	0.0011			0.0011
			Chromium	NA				NA	None	0.17			0.17
			Copper	NA				NA	Gastrointestinal tract	0.0058			0.0058
			Manganese	NA				NA	CNS	0.019			0.019
			Mercury (methyl)	NA				NA	Neurophysiological	0.94			0.94
			Nickel	NA				NA	weight	0.013			0.013
			Selenium	NA				NA	selenosis	0.089			0.089
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.41.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reference Reach	Barium	NA				NA	Kidney	0.00040			0.00040
			Copper	NA				NA	Gastrointestinal tract	0.0067			0.0067
			Manganese	NA				NA	CNS	0.0025			0.0025
			Mercury (methyl)	NA				NA	Neurophysiological	1.8			1.8
			Nickel	NA				NA	weight	0.0073			0.0073
			Selenium	NA				NA	selenosis	0.038			0.038
			Strontium	NA				NA	bone	0.00076			0.00076
			Zinc	NA				NA	blood	0.021			0.021
			PCB-1254	9.E-05				9.E-05	eye	5.2			5.2
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.016			0.016
			alpha-Chlordane	1.E-06				1.E-06	NA	0.014			0.014
			gamma-Chlordane	7.E-07				7.E-07	NA	0.0093			0.0093
			Potassium-40	1.E-07				1.E-07					
			Chemical Total					4.E-04					7
		Exposure Point Total						4.E-04					7
	Exposure Medium Total							4.E-04					7
Medium Total								4.E-04					7
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	7

TABLE 9.42.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reference Reach											
			Barium	NA				NA	Kidney	0.00044			0.00044
			Chromium	NA				NA	None	0.036			0.036
			Copper	NA				NA	Gastrointestinal tract	0.0044			0.0044
			Manganese	NA				NA	CNS	0.0025			0.0025
			Mercury (methyl)	NA				NA	Neurophysiological	0.73			0.73
			Selenium	NA				NA	selenosis	0.055			0.055
			Strontium	NA				NA	bone	0.0021			0.0021
			Zinc	NA				NA	blood	0.049			0.049
			Chemical Total					0.E+00					0.9
		Exposure Point Total						0.E+00					0.9
	Exposure Medium Total							0.E+00					0.9
Medium Total								0.E+00					0.9
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	0.9

TABLE 9.43.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reference Reach											
			Copper	NA				NA	Gastrointestinal tract	0.030			0.030
			Manganese	NA				NA	CNS	0.0051			0.0051
			Mercury (methyl)	NA				NA	Neurophysiological	8.9			8.9
			Selenium	NA				NA	selenosis	0.34			0.34
			Strontium	NA				NA	bone	0.0014			0.0014
			Zinc	NA				NA	blood	0.13			0.13
			PCB-1260	6.E-05				6.E-05	NA	NA			NA
			Radium-226	8.E-09				8.E-09					
			Chemical Total					6.E-05					9
		Exposure Point Total						6.E-05					9
	Exposure Medium Total							6.E-05					9
Medium Total								6.E-05					9
Receptor Total							Receptor Risk Total	6.E-05				Receptor HI Total	9

TABLE 9.44.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reference Reach	Barium	NA				NA	Kidney	0.0052			0.0052
			Chromium	NA				NA	None	0.77			0.77
			Copper	NA				NA	Gastrointestinal tract	0.027			0.027
			Manganese	NA				NA	CNS	0.088			0.088
			Mercury (methyl)	NA				NA	Neurophysiological	4.4			4.4
			Nickel	NA				NA	weight	0.060			0.060
			Selenium	NA				NA	selenosis	0.42			0.42
			Chemical Total					0.E+00					6
		Exposure Point Total						0.E+00					6
	Exposure Medium Total							0.E+00					6
Medium Total								0.E+00					6
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	6

TABLE 9.45.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reference Reach	Barium	NA				NA	Kidney	0.0018			0.0018
			Copper	NA				NA	Gastrointestinal tract	0.031			0.031
			Manganese	NA				NA	CNS	0.012			0.012
			Mercury (methyl)	NA				NA	Neurophysiological	8.2			8.2
			Nickel	NA				NA	weight	0.034			0.034
			Selenium	NA				NA	selenosis	0.18			0.18
			Strontium	NA				NA	bone	0.0036			0.0036
			Zinc	NA				NA	blood	0.096			0.096
			PCB-1254	8.E-05				8.E-05	eye	24.			24.
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.074			0.074
			alpha-Chlordane	1.E-06				1.E-06	NA	0.064			0.064
			gamma-Chlordane	7.E-07				7.E-07	NA	0.043			0.043
			Potassium-40	2.E-08				2.E-08					
			Chemical Total					4.E-04					33
		Exposure Point Total						4.E-04					33
	Exposure Medium Total							4.E-04					33
Medium Total								4.E-04					33
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	33

TABLE 9.46.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk: Ingestion	Carcinogenic Risk: Inhalation	Carcinogenic Risk: Dermal	Carcinogenic Risk: External (Radiation)	Carcinogenic Risk: Exposure Routes Total	Non-Carcinogenic Hazard Quotient: Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient: Ingestion	Non-Carcinogenic Hazard Quotient: Inhalation	Non-Carcinogenic Hazard Quotient: Dermal	Non-Carcinogenic Hazard Quotient: Exposure Routes Total
Crappie	Crappie	Emory River Reference Reach											
			Barium	NA				NA	Kidney	0.0020			0.0020
			Chromium	NA				NA	None	0.17			0.17
			Copper	NA				NA	Gastrointestinal tract	0.021			0.021
			Manganese	NA				NA	CNS	0.012			0.012
			Mercury (methyl)	NA				NA	Neurophysiological	3.4			3.4
			Selenium	NA				NA	selenosis	0.26			0.26
			Strontium	NA				NA	bone	0.0097			0.0097
			Zinc	NA				NA	blood	0.23			0.23
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 9.47.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Little Emory River											
			Barium	NA				NA	Kidney	0.00015			0.00015
			Copper	NA				NA	Gastrointestinal tract	0.0061			0.0061
			Manganese	NA				NA	CNS	0.00067			0.00067
			Mercury (methyl)	NA				NA	Neurophysiological	0.90			0.90
			Nickel	NA				NA	weight	0.017			0.017
			Selenium	NA				NA	selenosis	0.080			0.080
			Strontium	NA				NA	bone	0.00040			0.00040
			Zinc	NA				NA	blood	0.017			0.017
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.48.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Little Emory River											
			Aluminum	NA				NA	Neurological	0.0031			0.0031
			Barium	NA				NA	Kidney	0.00020			0.00020
			Chromium	NA				NA	None	0.038			0.038
			Copper	NA				NA	Gastrointestinal tract	0.0055			0.0055
			Manganese	NA				NA	CNS	0.0057			0.0057
			Mercury (methyl)	NA				NA	Neurophysiological	0.69			0.69
			Selenium	NA				NA	selenosis	0.096			0.096
			Strontium	NA				NA	bone	0.00098			0.00098
			Zinc	NA				NA	blood	0.040			0.040
			Chemical Total					0.E+00					0.9
		Exposure Point Total						0.E+00					0.9
	Exposure Medium Total							0.E+00					0.9
Medium Total								0.E+00					0.9
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	0.9

TABLE 9.49.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Little Emory River	Copper	NA				NA	Gastrointestinal tract	0.013			0.013
			Manganese	NA				NA	CNS	0.0011			0.0011
			Mercury (methyl)	NA				NA	Neurophysiological	1.2			1.2
			Selenium	NA				NA	selenosis	0.048			0.048
			Strontium	NA				NA	bone	0.000076			0.000076
			Zinc	NA				NA	blood	0.017			0.017
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.50.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Little Emory River											
			Barium	NA				NA	Kidney	0.00034			0.00034
			Chromium	NA				NA	None	0.059			0.059
			Copper	NA				NA	Gastrointestinal tract	0.0033			0.0033
			Manganese	NA				NA	CNS	0.0012			0.0012
			Mercury (methyl)	NA				NA	Neurophysiological	0.96			0.96
			Nickel	NA				NA	weight	0.0058			0.0058
			Selenium	NA				NA	selenosis	0.069			0.069
			Strontium	NA				NA	bone	0.00041			0.00041
			Zinc	NA				NA	blood	0.018			0.018
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.51.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Little Emory River											
			Barium	NA				NA	Kidney	0.00069			0.00069
			Copper	NA				NA	Gastrointestinal tract	0.029			0.029
			Manganese	NA				NA	CNS	0.0031			0.0031
			Mercury (methyl)	NA				NA	Neurophysiological	4.2			4.2
			Nickel	NA				NA	weight	0.081			0.081
			Selenium	NA				NA	selenosis	0.38			0.38
			Strontium	NA				NA	bone	0.0019			0.0019
			Zinc	NA				NA	blood	0.079			0.079
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 9.52.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Little Emory River											
			Aluminum	NA				NA	Neurological	0.014			0.014
			Barium	NA				NA	Kidney	0.00094			0.00094
			Chromium	NA				NA	None	0.18			0.18
			Copper	NA				NA	Gastrointestinal tract	0.026			0.026
			Manganese	NA				NA	CNS	0.027			0.027
			Mercury (methyl)	NA				NA	Neurophysiological	3.2			3.2
			Selenium	NA				NA	selenosis	0.45			0.45
			Strontium	NA				NA	bone	0.0046			0.0046
			Zinc	NA				NA	blood	0.19			0.19
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 9.53.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Little Emory River	Copper	NA				NA	Gastrointestinal tract	0.062			0.062
			Manganese	NA				NA	CNS	0.0052			0.0052
			Mercury (methyl)	NA				NA	Neurophysiological	5.5			5.5
			Selenium	NA				NA	selenosis	0.23			0.23
			Strontium	NA				NA	bone	0.00035			0.00035
			Zinc	NA				NA	blood	0.081			0.081
			Chemical Total					0.E+00					6
		Exposure Point Total						0.E+00					6
	Exposure Medium Total							0.E+00					6
Medium Total								0.E+00					6
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	6

TABLE 9.54.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Little Emory River											
			Barium	NA				NA	Kidney	0.0016			0.0016
			Chromium	NA				NA	None	0.27			0.27
			Copper	NA				NA	Gastrointestinal tract	0.016			0.016
			Manganese	NA				NA	CNS	0.0057			0.0057
			Mercury (methyl)	NA				NA	Neurophysiological	4.5			4.5
			Nickel	NA				NA	weight	0.027			0.027
			Selenium	NA				NA	selenosis	0.32			0.32
			Strontium	NA				NA	bone	0.0019			0.0019
			Zinc	NA				NA	blood	0.086			0.086
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 9.55.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reach A	Aluminum	NA		NA		NA	Neurological	0.0042		0.000022	0.0043
			Arsenic	2.E-05		9.E-08		2.E-05	skin	0.11		0.00060	0.11
			Barium	NA		NA		NA	Kidney	0.0057		0.000030	0.0057
			Boron	NA		NA		NA	weight	0.0030		0.000016	0.0030
			Chromium	NA		NA		NA	None	0.0042		0.000022	0.0042
			Cobalt	NA		NA		NA	Thyroid	0.030		0.00016	0.030
			Copper	NA		NA		NA	Gastrointestinal tract	0.0011		0.0000058	0.0011
			Iron	NA		NA		NA	Gastrointestinal tract	0.0046		0.000024	0.0046
			Manganese	NA		NA		NA	CNS	0.036		0.00019	0.036
			Mercury	NA		NA		NA	autoimmune	0.021		0.00011	0.021
			Molybdenum	NA		NA		NA	blood	0.0049		0.000026	0.0049
			Nickel	NA		NA		NA	weight	0.00080		0.00000083	0.00080
			Selenium	NA		NA		NA	selenosis	0.0042		0.000022	0.0042
			Strontium	NA		NA		NA	bone	0.0054		0.000028	0.0055
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0089		0.000046	0.0089
			Uranium-234	4.E-07				4.E-07					
			Chemical Total					2.E-05					0.2
		Exposure Point Total						2.E-05					0.2
	Exposure Medium Total							2.E-05					0.2
Medium Total								2.E-05					0.2
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.2

TABLE 9.56.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reach A	Aluminum	NA		NA		NA	Neurological	0.0099		0.000065	0.0100
			Arsenic	1.E-05		7.E-08		1.E-05	skin	0.27		0.0018	0.27
			Barium	NA		NA		NA	Kidney	0.013		0.000088	0.013
			Boron	NA		NA		NA	weight	0.0071		0.000047	0.0071
			Chromium	NA		NA		NA	None	0.0098		0.000065	0.0099
			Cobalt	NA		NA		NA	Thyroid	0.070		0.00046	0.071
			Copper	NA		NA		NA	Gastrointestinal tract	0.0026		0.000017	0.0026
			Iron	NA		NA		NA	Gastrointestinal tract	0.011		0.000071	0.011
			Manganese	NA		NA		NA	CNS	0.083		0.00055	0.083
			Mercury	NA		NA		NA	autoimmune	0.049		0.00032	0.049
			Molybdenum	NA		NA		NA	blood	0.011		0.000075	0.011
			Nickel	NA		NA		NA	weight	0.0019		0.0000025	0.0019
			Selenium	NA		NA		NA	selenosis	0.0097		0.000064	0.0098
			Strontium	NA		NA		NA	bone	0.013		0.000084	0.013
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.021		0.00014	0.021
			Uranium-234	5.E-08				5.E-08					
			Chemical Total					1.E-05					0.6
		Exposure Point Total						1.E-05					0.6
	Exposure Medium Total							1.E-05					0.6
Medium Total								1.E-05					0.6
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.6

TABLE 9.57.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach A	Aluminum	NA		NA		NA	Neurological	0.013		NA	0.013
			Antimony	NA		NA		NA	blood	0.0012		NA	0.0012
			Arsenic	3.E-06		4.E-06		7.E-06	skin	0.018		0.026	0.044
			Barium	NA		NA		NA	Kidney	0.00013		NA	0.00013
			Beryllium	NA		NA		NA	intestinal tract	0.00024		NA	0.00024
			Boron	NA		NA		NA	weight	0.000047		NA	0.000047
			Chromium	NA		NA		NA	None	0.0043		NA	0.0043
			Cobalt	NA		NA		NA	Thyroid	0.0083		NA	0.0083
			Copper	NA		NA		NA	Gastrointestinal tract	0.00017		NA	0.00017
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000052		NA	0.000052
			Manganese	NA		NA		NA	CNS	0.0014		NA	0.0014
			Mercury	NA		NA		NA	autoimmune	0.00013		NA	0.00013
			Nickel	NA		NA		NA	weight	0.00043		NA	0.00043
			Strontium	NA		NA		NA	bone	0.0000086		NA	0.0000086
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0034		NA	0.0034
			Zinc	NA		NA		NA	blood	0.00019		NA	0.00019
			Iron	NA		NA		NA	Gastrointestinal tract	0.014		NA	0.014
			Acenaphthylene	NA		NA		NA	NA	0.0000		0.000000015	0.000000017
			Anthracene	NA		NA		NA	None	0.0000		0.0000	0.0000
			Benzo(a)anthracene	4.E-10		2.E-09		3.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	4.E-09		3.E-08		3.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	5.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	5.E-11		3.E-10		3.E-10	NA	NA		NA	NA
			Chrysene	4.E-12		3.E-11		3.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	1.E-09		6.E-09		7.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.000000085		0.00000050	0.00000059
			Fluorene	NA		NA		NA	blood	0.0000		0.000000023	0.000000026
			Indeno(1,2,3-cd)pyrene	3.E-10		2.E-09		2.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000023		0.00000010	0.00000013
			Phenanthrene	NA		NA		NA	NA	0.000000051		0.00000023	0.00000028
			Pyrene	NA		NA		NA	kidney	0.000000081		0.00000037	0.00000045
			PCB-1254	1.E-09		7.E-09		8.E-09	eye	0.000077		0.00049	0.00057
			PCB-1260	8.E-10		5.E-09		6.E-09	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			beta-BHC	1.E-10		NA		1.E-10	NA	0.000000019		NA	0.000000019
			Heptachlor	1.E-10		NA		1.E-10	liver	0.00000013		NA	0.00000013
			Cesium-137	5.E-09			5.E-07	5.E-07					
			Potassium-40	1.E-07			3.E-06	3.E-06					
			Radium-226	1.E-07			2.E-06	2.E-06					
			Radium-228	5.E-07			4.E-06	5.E-06					
			Thorium-228	8.E-08			2.E-09	8.E-08					
			Thorium-230	4.E-08			2.E-10	4.E-08					
			Thorium-232	5.E-08			1.E-10	5.E-08					
			Uranium-234	3.E-08			6.E-11	3.E-08					
			Uranium-235	4.E-09			2.E-08	2.E-08					
			Uranium-238	3.E-08			3.E-08	6.E-08					
			Chemical Total					2.E-05					0.09
		Exposure Point Total						2.E-05					0.09
	Exposure Medium Total							2.E-05					0.09
Medium Total								2.E-05					0.09
Surface Water	Surface Water	Clinch River Reach A	Aluminum	NA		NA		NA	Neurological	0.000019		0.0000069	0.000026
			Arsenic	8.E-08		3.E-08		1.E-07	skin	0.00051		0.00019	0.00071
			Barium	NA		NA		NA	Kidney	0.000026		0.00013	0.00016
			Boron	NA		NA		NA	weight	0.000014		0.0000049	0.000019
			Chromium	NA		NA		NA	None	0.000019		0.00052	0.00054
			Cobalt	NA		NA		NA	Thyroid	0.00014		0.000098	0.00023
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000050		0.0000018	0.0000067
			Iron	NA		NA		NA	Gastrointestinal tract	0.000021		0.0000074	0.000028
			Manganese	NA		NA		NA	CNS	0.00016		0.0014	0.0016
			Mercury	NA		NA		NA	autoimmune	0.000095		0.000043	0.00014
			Molybdenum	NA		NA		NA	blood	0.000022		0.0000079	0.000030
			Nickel	NA		NA		NA	weight	0.0000036		0.0000065	0.000010
			Selenium	NA		NA		NA	selenosis	0.000019		0.0000084	0.000027
			Strontium	NA		NA		NA	bone	0.000024		0.0000088	0.000033
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000040		0.00055	0.00059
			Uranium-234	2.E-09				2.E-09					
			Chemical Total					1.E-07					0.004
Medium Total								1.E-07					0.004
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.1

TABLE 9.58.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach A	Aluminum	NA		NA		NA	Neurological	0.025		NA	0.025
			Antimony	NA		NA		NA	blood	0.0022		NA	0.0022
			Arsenic	2.E-06		2.E-06		3.E-06	skin	0.033		0.025	0.058
			Barium	NA		NA		NA	Kidney	0.00023		NA	0.00023
			Beryllium	NA		NA		NA	intestinal tract	0.00044		NA	0.00044
			Boron	NA		NA		NA	weight	0.000088		NA	0.000088
			Chromium	NA		NA		NA	None	0.0081		NA	0.0081
			Cobalt	NA		NA		NA	Thyroid	0.016		NA	0.016
			Copper	NA		NA		NA	Gastrointestinal tract	0.00032		NA	0.00032
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000097		NA	0.000097
			Manganese	NA		NA		NA	CNS	0.0025		NA	0.0025
			Mercury	NA		NA		NA	autoimmune	0.00024		NA	0.00024
			Nickel	NA		NA		NA	weight	0.00080		NA	0.00080
			Strontium	NA		NA		NA	bone	0.000016		NA	0.000016
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0063		NA	0.0063
			Zinc	NA		NA		NA	blood	0.00036		NA	0.00036
			Iron	NA		NA		NA	Gastrointestinal tract	0.026		NA	0.026
			Acenaphthylene	NA		NA		NA	NA	0.0000		0.000000014	0.000000019
			Anthracene	NA		NA		NA	None	0.0000		0.0000	0.0000
			Benzo(a)anthracene	3.E-10		9.E-10		1.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	3.E-09		1.E-08		1.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	3.E-10		1.E-09		2.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	3.E-11		1.E-10		1.E-10	NA	NA		NA	NA
			Chrysene	3.E-12		1.E-11		1.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	7.E-10		2.E-09		3.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000016		0.00000048	0.00000064
			Fluorene	NA		NA		NA	blood	0.0000		0.000000022	0.000000029
			Indeno(1,2,3-cd)pyrene	2.E-10		7.E-10		9.E-10	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000042		0.000000099	0.00000014
			Phenanthrene	NA		NA		NA	NA	0.000000095		0.00000022	0.00000032
			Pyrene	NA		NA		NA	kidney	0.00000015		0.00000036	0.00000051
			PCB-1254	7.E-10		3.E-09		3.E-09	eye	0.00014		0.00047	0.00062
			PCB-1260	5.E-10		2.E-09		3.E-09	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			beta-BHC	6.E-11		NA		6.E-11	NA	0.000000036		NA	0.000000036
			Heptachlor	7.E-11		NA		7.E-11	liver	0.00000025		NA	0.00000025
			Cesium-137	3.E-09			2.E-07	2.E-07					
			Potassium-40	7.E-08			1.E-06	1.E-06					
			Radium-226	6.E-08			1.E-06	1.E-06					
			Radium-228	2.E-07			2.E-06	2.E-06					
			Thorium-228	4.E-08			1.E-09	4.E-08					
			Thorium-230	2.E-08			9.E-11	2.E-08					
			Thorium-232	2.E-08			4.E-11	2.E-08					
			Uranium-234	1.E-08			3.E-11	1.E-08					
			Uranium-235	2.E-09			7.E-09	9.E-09					
			Uranium-238	2.E-08			1.E-08	3.E-08					
			Chemical Total					8.E-06					0.1
		Exposure Point Total						8.E-06					0.1
	Exposure Medium Total							8.E-06					0.1
Medium Total								8.E-06					0.1
Surface Water	Surface Water	Clinch River Reach A	Aluminum	NA		NA		NA	Neurological	0.000030		0.0000087	0.000038
			Arsenic	5.E-08		2.E-08		7.E-08	skin	0.00080		0.00025	0.0010
			Barium	NA		NA		NA	Kidney	0.000040		0.00017	0.00021
			Boron	NA		NA		NA	weight	0.000021		0.0000062	0.000027
			Chromium	NA		NA		NA	None	0.000029		0.00066	0.00069
			Cobalt	NA		NA		NA	Thyroid	0.00021		0.000062	0.00027
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000077		0.0000023	0.0000100
			Iron	NA		NA		NA	Gastrointestinal tract	0.000032		0.0000094	0.000041
			Manganese	NA		NA		NA	CNS	0.00025		0.0018	0.0021
			Mercury	NA		NA		NA	autoimmune	0.00015		0.000054	0.00020
			Molybdenum	NA		NA		NA	blood	0.000034		0.000010	0.000044
			Nickel	NA		NA		NA	weight	0.0000056		0.0000082	0.000014
			Selenium	NA		NA		NA	selenosis	0.000029		0.000011	0.000040
			Strontium	NA		NA		NA	bone	0.000038		0.000011	0.000049
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000062		0.00070	0.00076
			Uranium-234	8.E-10				8.E-10					
			Chemical Total					7.E-08					0.006
Medium Total								7.E-08					0.006
Receptor Total							Receptor Risk Total	8.E-06				Receptor HI Total	0.2

TABLE 9.59.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach A											
			Copper	NA				NA	Gastrointestinal tract	0.0082			0.0082
			Manganese	NA				NA	CNS	0.0012			0.0012
			Mercury (methyl)	NA				NA	Neurophysiological	2.2			2.2
			Nickel	NA				NA	weight	0.0050			0.0050
			Selenium	NA				NA	selenosis	0.11			0.11
			Strontium	NA				NA	bone	0.00041			0.00041
			Zinc	NA				NA	blood	0.033			0.033
			PCB-1254	5.E-05				5.E-05	eye	3.1			3.1
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	5.E-07				5.E-07	liver	0.0074			0.0074
			Potassium-40	9.E-08				9.E-08					
			Radium-226	2.E-08				2.E-08					
			Chemical Total					2.E-04					5
		Exposure Point Total						2.E-04					5
	Exposure Medium Total							2.E-04					5
Medium Total								2.E-04					5
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	5

TABLE 9.60.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach A											
			Barium	NA				NA	Kidney	0.00032			0.00032
			Cobalt	NA				NA	Thyroid	0.038			0.038
			Copper	NA				NA	Gastrointestinal tract	0.0052			0.0052
			Manganese	NA				NA	CNS	0.0027			0.0027
			Mercury (methyl)	NA				NA	Neurophysiological	0.77			0.77
			Selenium	NA				NA	selenosis	0.17			0.17
			Silver	NA				NA	skin	0.00067			0.00067
			Strontium	NA				NA	bone	0.00077			0.00077
			Zinc	NA				NA	blood	0.042			0.042
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.61.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach A	Arsenic	1.E-06				1.E-06	skin	0.0049			0.0049
			Barium	NA				NA	Kidney	0.00024			0.00024
			Chromium	NA				NA	None	0.049			0.049
			Copper	NA				NA	Gastrointestinal tract	0.068			0.068
			Manganese	NA				NA	CNS	0.0021			0.0021
			Mercury (methyl)	NA				NA	Neurophysiological	1.1			1.1
			Nickel	NA				NA	weight	0.0091			0.0091
			Selenium	NA				NA	selenosis	0.073			0.073
			Strontium	NA				NA	bone	0.00051			0.00051
			Zinc	NA				NA	blood	0.018			0.018
			PCB-1254	7.E-05				7.E-05	eye	4.0			4.0
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	7.E-07				7.E-07	liver	0.0095			0.0095
			alpha-Chlordane	1.E-06				1.E-06	NA	0.013			0.013
			gamma-Chlordane	3.E-07				3.E-07	NA	0.0046			0.0046
			Potassium-40	2.E-10				2.E-10					
			Radium-226	1.E-09				1.E-09					
			Chemical Total					2.E-04					5
		Exposure Point Total						2.E-04					5
	Exposure Medium Total							2.E-04					5
Medium Total								2.E-04					5
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	5

TABLE 9.62.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Clinch River Reach A											
			Chromium	NA				NA	None	0.030			0.030
			Copper	NA				NA	Gastrointestinal tract	0.0067			0.0067
			Manganese	NA				NA	CNS	0.0011			0.0011
			Mercury (methyl)	NA				NA	Neurophysiological	0.57			0.57
			Nickel	NA				NA	weight	0.0042			0.0042
			Selenium	NA				NA	selenosis	0.044			0.044
			Strontium	NA				NA	bone	0.00016			0.00016
			Zinc	NA				NA	blood	0.020			0.020
			Chemical Total					0.E+00					0.7
		Exposure Point Total						0.E+00					0.7
	Exposure Medium Total							0.E+00					0.7
Medium Total								0.E+00					0.7
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	0.7

TABLE 9.63.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach A											
			Copper	NA				NA	Gastrointestinal tract	0.038			0.038
			Manganese	NA				NA	CNS	0.0055			0.0055
			Mercury (methyl)	NA				NA	Neurophysiological	10.			10.
			Nickel	NA				NA	weight	0.023			0.023
			Selenium	NA				NA	selenosis	0.50			0.50
			Strontium	NA				NA	bone	0.0019			0.0019
			Zinc	NA				NA	blood	0.15			0.15
			PCB-1254	5.E-05				5.E-05	eye	14.			14.
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	5.E-07				5.E-07	liver	0.035			0.035
			Potassium-40	6.E-10				6.E-10					
			Radium-226	2.E-08				2.E-08					
			Chemical Total					2.E-04					25
		Exposure Point Total						2.E-04					25
	Exposure Medium Total							2.E-04					25
Medium Total								2.E-04					25
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	25

TABLE 9.64.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach A											
			Barium	NA				NA	Kidney	0.0015			0.0015
			Cobalt	NA				NA	Thyroid	0.18			0.18
			Copper	NA				NA	Gastrointestinal tract	0.024			0.024
			Manganese	NA				NA	CNS	0.012			0.012
			Mercury (methyl)	NA				NA	Neurophysiological	3.6			3.6
			Selenium	NA				NA	selenosis	0.81			0.81
			Silver	NA				NA	skin	0.0031			0.0031
			Strontium	NA				NA	bone	0.0036			0.0036
			Zinc	NA				NA	blood	0.19			0.19
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 9.65.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach A											
			Barium	NA				NA	Kidney	0.0011			0.0011
			Chromium	NA				NA	None	0.23			0.23
			Copper	NA				NA	Gastrointestinal tract	0.32			0.32
			Manganese	NA				NA	CNS	0.0100			0.0100
			Mercury (methyl)	NA				NA	Neurophysiological	5.2			5.2
			Nickel	NA				NA	weight	0.042			0.042
			Selenium	NA				NA	selenosis	0.34			0.34
			Strontium	NA				NA	bone	0.0024			0.0024
			Zinc	NA				NA	blood	0.085			0.085
			PCB-1254	6.E-05				6.E-05	eye	19.			19.
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	1.E-06				1.E-06	NA	NA			NA
			4,4'-DDT	6.E-07				6.E-07	liver	0.044			0.044
			alpha-Chlordane	9.E-07				9.E-07	NA	0.061			0.061
			gamma-Chlordane	3.E-07				3.E-07	NA	0.021			0.021
			Potassium-40	6.E-11				6.E-11					
			Radium-226	3.E-10				3.E-10					
			Chemical Total					2.E-04					25
		Exposure Point Total						2.E-04					25
	Exposure Medium Total							2.E-04					25
Medium Total								2.E-04					25
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	25

TABLE 9.66.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Clinch River Reach A											
			Chromium	NA				NA	None	0.14			0.14
			Copper	NA				NA	Gastrointestinal tract	0.031			0.031
			Manganese	NA				NA	CNS	0.0051			0.0051
			Mercury (methyl)	NA				NA	Neurophysiological	2.6			2.6
			Nickel	NA				NA	weight	0.020			0.020
			Selenium	NA				NA	selenosis	0.21			0.21
			Strontium	NA				NA	bone	0.00072			0.00072
			Zinc	NA				NA	blood	0.093			0.093
			Chemical Total					0.E+00					3
		Exposure Point Total						0.E+00					3
	Exposure Medium Total							0.E+00					3
Medium Total								0.E+00					3
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	3

TABLE 9.67.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reach B	Aluminum	NA		NA		NA	Neurological	0.0034		0.000018	0.0034
			Arsenic	2.E-05		9.E-08		2.E-05	skin	0.11		0.00060	0.11
			Barium	NA		NA		NA	Kidney	0.0054		0.000028	0.0054
			Boron	NA		NA		NA	weight	0.0027		0.000014	0.0027
			Chromium	NA		NA		NA	None	0.0036		0.000019	0.0036
			Copper	NA		NA		NA	Gastrointestinal tract	0.0012		0.0000065	0.0013
			Iron	NA		NA		NA	Gastrointestinal tract	0.0047		0.000024	0.0047
			Manganese	NA		NA		NA	CNS	0.039		0.00020	0.039
			Molybdenum	NA		NA		NA	blood	0.0051		0.000027	0.0051
			Nickel	NA		NA		NA	weight	0.00074		0.00000078	0.00074
			Selenium	NA		NA		NA	selenosis	0.0021		0.000011	0.0021
			Strontium	NA		NA		NA	bone	0.0053		0.000027	0.0053
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0088		0.000046	0.0089
			Radium-226	6.E-06				6.E-06					
			Uranium-234	4.E-07				4.E-07					
			Uranium-238	6.E-07				6.E-07					
			Chemical Total					2.E-05					0.2
		Exposure Point Total						2.E-05					0.2
	Exposure Medium Total							2.E-05					0.2
Medium Total								2.E-05					0.2
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.2

TABLE 9.68.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reach B	Aluminum	NA		NA		NA	Neurological	0.0080		0.000053	0.0080
			Arsenic	1.E-05		7.E-08		1.E-05	skin	0.27		0.0018	0.27
			Barium	NA		NA		NA	Kidney	0.013		0.000083	0.013
			Boron	NA		NA		NA	weight	0.0063		0.000041	0.0063
			Chromium	NA		NA		NA	None	0.0083		0.000055	0.0084
			Copper	NA		NA		NA	Gastrointestinal tract	0.0029		0.000019	0.0029
			Iron	NA		NA		NA	Gastrointestinal tract	0.011		0.000072	0.011
			Manganese	NA		NA		NA	CNS	0.091		0.00060	0.092
			Molybdenum	NA		NA		NA	blood	0.012		0.000078	0.012
			Nickel	NA		NA		NA	weight	0.0017		0.0000023	0.0017
			Selenium	NA		NA		NA	selenosis	0.0049		0.000032	0.0049
			Strontium	NA		NA		NA	bone	0.012		0.000081	0.012
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.021		0.00014	0.021
			Radium-226	8.E-07				8.E-07					
			Uranium-234	5.E-08				5.E-08					
			Uranium-238	8.E-08				8.E-08					
			Chemical Total					1.E-05					0.5
		Exposure Point Total						1.E-05					0.5
	Exposure Medium Total							1.E-05					0.5
Medium Total								1.E-05					0.5
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.5

TABLE 9.69.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach B	Aluminum	NA		NA		NA	Neurological	0.0064		NA	0.0064
			Antimony	NA		NA		NA	blood	0.00081		NA	0.00081
			Arsenic	4.E-06		6.E-06		1.E-05	skin	0.027		0.038	0.065
			Barium	NA		NA		NA	Kidney	0.00013		NA	0.00013
			Beryllium	NA		NA		NA	intestinal tract	0.000097		NA	0.000097
			Boron	NA		NA		NA	weight	0.000033		NA	0.000033
			Chromium	NA		NA		NA	None	0.0030		NA	0.0030
			Cobalt	NA		NA		NA	Thyroid	0.011		NA	0.011
			Copper	NA		NA		NA	Gastrointestinal tract	0.00011		NA	0.00011
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000053		NA	0.000053
			Lead	NA		NA		NA	NA	NA		NA	NA
			Manganese	NA		NA		NA	CNS	0.0022		NA	0.0022
			Mercury	NA		NA		NA	autoimmune	0.00043		NA	0.00043
			Nickel	NA		NA		NA	weight	0.00019		NA	0.00019
			Selenium	NA		NA		NA	selenosis	0.000067		NA	0.000067
			Strontium	NA		NA		NA	bone	0.0000073		NA	0.0000073
			Thallium	NA		NA		NA	Hair follicle	0.058		NA	0.058
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0018		NA	0.0018
			Zinc	NA		NA		NA	blood	0.000055		NA	0.000055
			Iron	NA		NA		NA	Gastrointestinal tract	0.0092		NA	0.0092
			Anthracene	NA		NA		NA	None	0.0000		0.0000	0.0000
			Benzo(a)anthracene	7.E-10		4.E-09		5.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	7.E-09		4.E-08		5.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	1.E-09		6.E-09		7.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	8.E-11		4.E-10		5.E-10	NA	NA		NA	NA
			Chrysene	8.E-12		5.E-11		6.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	1.E-09		9.E-09		1.E-08	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000012		0.00000072	0.00000085
			Fluorene	NA		NA		NA	blood	0.0000		0.000000053	0.000000062
			Indeno(1,2,3-cd)pyrene	4.E-10		2.E-09		3.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.000000057		0.00000026	0.00000032
			Phenanthrene	NA		NA		NA	NA	0.000000081		0.00000037	0.00000045
			Pyrene	NA		NA		NA	kidney	0.00000019		0.00000086	0.0000010
			PCB-1254	2.E-09		1.E-08		1.E-08	eye	0.00013		0.00084	0.00097
			PCB-1260	1.E-09		9.E-09		1.E-08	NA	NA		NA	NA
			4,4'-DDD	2.E-11		NA		2.E-11	NA	NA		NA	NA

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			alpha-BHC	2.E-10		NA		2.E-10	Liver	0.000000011		NA	0.000000011
			beta-BHC	8.E-11		NA		8.E-11	NA	0.000000016		NA	0.000000016
			Cesium-137	1.E-08			1.E-06	1.E-06					
			Potassium-40	2.E-07			4.E-06	4.E-06					
			Radium-226	7.E-08			1.E-06	1.E-06					
			Radium-228	5.E-07			4.E-06	4.E-06					
			Thorium-228	4.E-08			1.E-09	5.E-08					
			Thorium-230	3.E-08			2.E-10	3.E-08					
			Thorium-232	3.E-08			8.E-11	3.E-08					
			Thorium-234	2.E-08			4.E-08	5.E-08					
			Uranium-234	2.E-08			5.E-11	2.E-08					
			Uranium-238	3.E-08			2.E-08	5.E-08					
			Chemical Total					2.E-05					0.2
		Exposure Point Total						2.E-05					0.2
	Exposure Medium Total							2.E-05					0.2
Medium Total								2.E-05					0.2
Surface Water	Surface Water	Clinch River Reach B	Aluminum	NA		NA		NA	Neurological	0.000015		0.0000055	0.000021
			Arsenic	8.E-08		3.E-08		1.E-07	skin	0.00051		0.00019	0.00071
			Barium	NA		NA		NA	Kidney	0.000024		0.00013	0.00015
			Boron	NA		NA		NA	weight	0.000012		0.0000043	0.000016
			Chromium	NA		NA		NA	None	0.000016		0.00044	0.00046
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000056		0.0000020	0.0000076
			Iron	NA		NA		NA	Gastrointestinal tract	0.000021		0.0000075	0.000029
			Manganese	NA		NA		NA	CNS	0.00018		0.0016	0.0018
			Molybdenum	NA		NA		NA	blood	0.000023		0.0000082	0.000031
			Nickel	NA		NA		NA	weight	0.0000033		0.0000060	0.0000094
			Selenium	NA		NA		NA	selenosis	0.0000094		0.0000042	0.000014
			Strontium	NA		NA		NA	bone	0.000024		0.0000085	0.000032
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000040		0.00055	0.00059
			Radium-226	3.E-08				3.E-08					
			Uranium-234	2.E-09				2.E-09					
			Uranium-238	3.E-09				3.E-09					
			Chemical Total					1.E-07					0.004
		Exposure Point Total											0.004
	Exposure Medium Total							1.E-07					0.004
Medium Total								1.E-07					0.004
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.2

TABLE 9.70.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Seasonally Exposed Sediment	Seasonally Exposed Sediment	Clinch River Reach B	Aluminum	NA		NA		NA	Neurological	0.012		NA	0.012
			Antimony	NA		NA		NA	blood	0.0015		NA	0.0015
			Arsenic	3.E-06		2.E-06		5.E-06	skin	0.050		0.037	0.087
			Barium	NA		NA		NA	Kidney	0.00024		NA	0.00024
			Beryllium	NA		NA		NA	intestinal tract	0.00018		NA	0.00018
			Boron	NA		NA		NA	weight	0.000062		NA	0.000062
			Chromium	NA		NA		NA	None	0.0056		NA	0.0056
			Cobalt	NA		NA		NA	Thyroid	0.021		NA	0.021
			Copper	NA		NA		NA	Gastrointestinal tract	0.00020		NA	0.00020
			Chromium VI	NA		NA		NA	Gastrointestinal tract	0.000098		NA	0.000098
			Lead	NA		NA		NA	NA	NA		NA	NA
			Manganese	NA		NA		NA	CNS	0.0041		NA	0.0041
			Mercury	NA		NA		NA	autoimmune	0.00079		NA	0.00079
			Nickel	NA		NA		NA	weight	0.00035		NA	0.00035
			Selenium	NA		NA		NA	selenosis	0.00012		NA	0.00012
			Strontium	NA		NA		NA	bone	0.000014		NA	0.000014
			Thallium	NA		NA		NA	Hair follicle	0.11		NA	0.11
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0034		NA	0.0034
			Zinc	NA		NA		NA	blood	0.00010		NA	0.00010
			Iron	NA		NA		NA	Gastrointestinal tract	0.017		NA	0.017
			Anthracene	NA		NA		NA	None	0.0000		0.0000	0.0000
			Benzo(a)anthracene	5.E-10		2.E-09		2.E-09	NA	NA		NA	NA
			Benzo(a)pyrene	4.E-09		2.E-08		2.E-08	NA	NA		NA	NA
			Benzo(b)fluoranthene	7.E-10		3.E-09		3.E-09	NA	NA		NA	NA
			Benzo(k)fluoranthene	5.E-11		2.E-10		2.E-10	NA	NA		NA	NA
			Chrysene	5.E-12		2.E-11		3.E-11	NA	NA		NA	NA
			Dibenz(a,h)anthracene	9.E-10		3.E-09		4.E-09	NA	NA		NA	NA
			Fluoranthene	NA		NA		NA	Kidney	0.00000023		0.00000070	0.00000092
			Fluorene	NA		NA		NA	blood	0.000000017		0.000000051	0.000000068
			Indeno(1,2,3-cd)pyrene	3.E-10		1.E-09		1.E-09	NA	NA		NA	NA
			Naphthalene	NA		NA		NA	weight	0.00000011		0.00000025	0.00000036
			Phenanthrene	NA		NA		NA	NA	0.00000015		0.00000036	0.00000051
			Pyrene	NA		NA		NA	kidney	0.00000035		0.00000082	0.0000012

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			PCB-1254	1.E-09		5.E-09		6.E-09	eye	0.00025		0.00081	0.0011
			PCB-1260	9.E-10		4.E-09		5.E-09	NA	NA		NA	NA
			4,4'-DDD	1.E-11		NA		1.E-11	NA	NA		NA	NA
			alpha-BHC	1.E-10		NA		1.E-10	Liver	0.000000021		NA	0.000000021
			beta-BHC	5.E-11		NA		5.E-11	NA	0.000000029		NA	0.000000029
			Cesium-137	7.E-09			5.E-07	5.E-07					
			Potassium-40	9.E-08			2.E-06	2.E-06					
			Radium-226	4.E-08			5.E-07	6.E-07					
			Radium-228	2.E-07			2.E-06	2.E-06					
			Thorium-228	2.E-08			6.E-10	2.E-08					
			Thorium-230	1.E-08			7.E-11	1.E-08					
			Thorium-232	2.E-08			3.E-11	2.E-08					
			Thorium-234	8.E-09			2.E-08	2.E-08					
			Uranium-234	1.E-08			2.E-11	1.E-08					
			Uranium-238	1.E-08			9.E-09	2.E-08					
			Chemical Total					1.E-05					0.3
		Exposure Point Total						1.E-05					0.3
	Exposure Medium Total							1.E-05					0.3
Medium Total								1.E-05					0.3
Surface Water	Surface Water	Swan Pond Embayment	Aluminum	NA		NA		NA	Neurological	0.000024		0.0000070	0.000031
			Arsenic	5.E-08		1.E-07		2.E-07	skin	0.00080		0.00025	0.0010
			Barium	NA		NA		NA	Kidney	0.000038		0.00016	0.00020
			Boron	NA		NA		NA	weight	0.000019		0.0000055	0.000024
			Chromium	NA		NA		NA	None	0.000025		0.00056	0.00059
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000087		0.0000026	0.000011
			Iron	NA		NA		NA	Gastrointestinal tract	0.000033		0.0000096	0.000042
			Manganese	NA		NA		NA	CNS	0.00027		0.0020	0.0023
			Molybdenum	NA		NA		NA	blood	0.000036		0.000010	0.000046
			Nickel	NA		NA		NA	weight	0.0000052		0.0000076	0.000013
			Selenium	NA		NA		NA	selenosis	0.000015		0.0000053	0.000020
			Strontium	NA		NA		NA	bone	0.000037		0.000011	0.000048
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000062		0.00070	0.00076
			Radium-226	1.E-08				1.E-08					
			Uranium-234	8.E-10				8.E-10					
			Uranium-238	1.E-09				1.E-09					
			Chemical Total					2.E-07					0.005
		Exposure Point Total											0.005
	Exposure Medium Total							2.E-07					0.005
Medium Total								2.E-07					0.005
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.3

TABLE 9.71.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach B											
			Barium	NA				NA	Kidney	0.0022			0.0022
			Cobalt	NA				NA	Thyroid	0.043			0.043
			Copper	NA				NA	Gastrointestinal tract	0.083			0.083
			Iron	NA				NA	Gastrointestinal tract	0.019			0.019
			Manganese	NA				NA	CNS	0.0046			0.0046
			Mercury (methyl)	NA				NA	Neurophysiological	1.3			1.3
			Nickel	NA				NA	weight	0.019			0.019
			Selenium	NA				NA	selenosis	0.11			0.11
			Strontium	NA				NA	bone	0.0060			0.0060
			Zinc	NA				NA	blood	0.030			0.030
			PCB-1254	8.E-05				8.E-05	eye	4.7			4.7
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.019			0.019
			alpha-Chlordane	6.E-07				6.E-07	NA	0.0083			0.0083
			Heptachlor	5.E-06				5.E-06	liver	0.0050			0.0050
			Chemical Total					3.E-04					6
		Exposure Point Total						3.E-04					6
	Exposure Medium Total							3.E-04					6
Medium Total								3.E-04					6
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	6

TABLE 9.72.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach B											
			Barium	NA				NA	Kidney	0.0014			0.0014
			Copper	NA				NA	Gastrointestinal tract	0.0046			0.0046
			Manganese	NA				NA	CNS	0.0088			0.0088
			Mercury (methyl)	NA				NA	Neurophysiological	0.66			0.66
			Molybdenum	NA				NA	blood	0.0070			0.0070
			Selenium	NA				NA	selenosis	0.16			0.16
			Strontium	NA				NA	bone	0.0056			0.0056
			Vanadium	NA				NA	Gastrointestinal tract	0.011			0.011
			Zinc	NA				NA	blood	0.036			0.036
			Chemical Total					0.E+00					0.9
		Exposure Point Total						0.E+00					0.9
	Exposure Medium Total							0.E+00					0.9
Medium Total								0.E+00					0.9
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	0.9

TABLE 9.73.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach B											
			Barium	NA				NA	Kidney	0.00024			0.00024
			Cobalt	NA				NA	Thyroid	0.048			0.048
			Copper	NA				NA	Gastrointestinal tract	0.024			0.024
			Manganese	NA				NA	CNS	0.0034			0.0034
			Mercury (methyl)	NA				NA	Neurophysiological	2.4			2.4
			Selenium	NA				NA	selenosis	0.049			0.049
			Strontium	NA				NA	bone	0.00075			0.00075
			Zinc	NA				NA	blood	0.022			0.022
			PCB-1260	5.E-04				5.E-04	NA	NA			NA
			4,4'-DDE	4.E-06				4.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.024			0.024
			alpha-Chlordane	5.E-07				5.E-07	NA	0.0068			0.0068
			Chemical Total					5.E-04					3
		Exposure Point Total						5.E-04					3
	Exposure Medium Total							5.E-04					3
Medium Total								5.E-04					3
Receptor Total							Receptor Risk Total	5.E-04				Receptor HI Total	3

TABLE 9.74.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach B											
			Barium	NA				NA	Kidney	0.010			0.010
			Cobalt	NA				NA	Thyroid	0.20			0.20
			Copper	NA				NA	Gastrointestinal tract	0.39			0.39
			Iron	NA				NA	Gastrointestinal tract	0.087			0.087
			Manganese	NA				NA	CNS	0.021			0.021
			Mercury (methyl)	NA				NA	Neurophysiological	6.0			6.0
			Nickel	NA				NA	weight	0.088			0.088
			Selenium	NA				NA	selenosis	0.49			0.49
			Strontium	NA				NA	bone	0.028			0.028
			Zinc	NA				NA	blood	0.14			0.14
			PCB-1254	8.E-05				8.E-05	eye	22.			22.
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.090			0.090
			alpha-Chlordane	6.E-07				6.E-07	NA	0.039			0.039
			Heptachlor	5.E-06				5.E-06	liver	0.023			0.023
			Chemical Total					3.E-04					29
		Exposure Point Total						3.E-04					29
	Exposure Medium Total							3.E-04					29
Medium Total								3.E-04					29
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	29

TABLE 9.75.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach B											
			Barium	NA				NA	Kidney	0.0066			0.0066
			Copper	NA				NA	Gastrointestinal tract	0.022			0.022
			Manganese	NA				NA	CNS	0.041			0.041
			Mercury (methyl)	NA				NA	Neurophysiological	3.1			3.1
			Molybdenum	NA				NA	blood	0.032			0.032
			Selenium	NA				NA	selenosis	0.73			0.73
			Strontium	NA				NA	bone	0.026			0.026
			Vanadium	NA				NA	Gastrointestinal tract	0.049			0.049
			Zinc	NA				NA	blood	0.17			0.17
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 9.76.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach B											
			Barium	NA				NA	Kidney	0.0011			0.0011
			Cobalt	NA				NA	Thyroid	0.22			0.22
			Copper	NA				NA	Gastrointestinal tract	0.11			0.11
			Manganese	NA				NA	CNS	0.016			0.016
			Mercury (methyl)	NA				NA	Neurophysiological	11.			11.
			Selenium	NA				NA	selenosis	0.23			0.23
			Strontium	NA				NA	bone	0.0035			0.0035
			Zinc	NA				NA	blood	0.10			0.10
			PCB-1260	4.E-04				4.E-04	NA	NA			NA
			4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.11			0.11
			alpha-Chlordane	5.E-07				5.E-07	NA	0.032			0.032
			Chemical Total					5.E-04					12
		Exposure Point Total						5.E-04					12
	Exposure Medium Total							5.E-04					12
Medium Total								5.E-04					12
Receptor Total							Receptor Risk Total	5.E-04				Receptor HI Total	12

TABLE 9.77.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.0025		0.000013	0.0025
			Arsenic	8.E-06		4.E-08		8.E-06	skin	0.050		0.00026	0.050
			Barium	NA		NA		NA	Kidney	0.0050		0.000026	0.0050
			Boron	NA		NA		NA	weight	0.0023		0.000012	0.0023
			Chromium	NA		NA		NA	None	0.0047		0.000024	0.0047
			Copper	NA		NA		NA	Gastrointestinal tract	0.00068		0.0000036	0.00069
			Iron	NA		NA		NA	Gastrointestinal tract	0.0049		0.000026	0.0050
			Manganese	NA		NA		NA	CNS	0.040		0.00021	0.040
			Molybdenum	NA		NA		NA	blood	0.0043		0.000022	0.0043
			Nickel	NA		NA		NA	weight	0.00089		0.00000093	0.00089
			Selenium	NA		NA		NA	selenosis	0.0024		0.000012	0.0024
			Strontium	NA		NA		NA	bone	0.0052		0.000027	0.0052
			Uranium-234	7.E-07				7.E-07					
			Uranium-238	5.E-07				5.E-07					
			Chemical Total					9.E-06					0.1
		Exposure Point Total						9.E-06					0.1
	Exposure Medium Total							9.E-06					0.1
Medium Total								9.E-06					0.1
Receptor Total							Receptor Risk Total	9.E-06				Receptor HI Total	0.1

TABLE 9.78.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.0059		0.000039	0.0059
			Arsenic	5.E-06		3.E-08		5.E-06	skin	0.12		0.00077	0.12
			Barium	NA		NA		NA	Kidney	0.012		0.000076	0.012
			Boron	NA		NA		NA	weight	0.0054		0.000036	0.0055
			Chromium	NA		NA		NA	None	0.011		0.000072	0.011
			Copper	NA		NA		NA	Gastrointestinal tract	0.0016		0.000011	0.0016
			Iron	NA		NA		NA	Gastrointestinal tract	0.012		0.000076	0.012
			Manganese	NA		NA		NA	CNS	0.093		0.00062	0.094
			Molybdenum	NA		NA		NA	blood	0.010		0.000066	0.010
			Nickel	NA		NA		NA	weight	0.0021		0.0000027	0.0021
			Selenium	NA		NA		NA	selenosis	0.0055		0.000036	0.0055
			Strontium	NA		NA		NA	bone	0.012		0.000080	0.012
			Uranium-234	9.E-08				9.E-08					
			Uranium-238	6.E-08				6.E-08					
			Chemical Total					5.E-06					0.3
		Exposure Point Total						5.E-06					0.3
	Exposure Medium Total							5.E-06					0.3
Medium Total								5.E-06					0.3
Receptor Total							Receptor Risk Total	5.E-06				Receptor HI Total	0.3

TABLE 9.79.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.000011		0.0000041	0.000015
			Arsenic	3.E-08		1.E-08		5.E-08	skin	0.00023		0.000085	0.00031
			Barium	NA		NA		NA	Kidney	0.000022		0.00011	0.00014
			Boron	NA		NA		NA	weight	0.000010		0.0000038	0.000014
			Chromium	NA		NA		NA	None	0.000021		0.00058	0.00060
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000031		0.0000011	0.0000042
			Iron	NA		NA		NA	Gastrointestinal tract	0.000022		0.0000080	0.000030
			Manganese	NA		NA		NA	CNS	0.00018		0.0016	0.0018
			Molybdenum	NA		NA		NA	blood	0.000019		0.0000070	0.000026
			Nickel	NA		NA		NA	weight	0.0000040		0.0000072	0.000011
			Selenium	NA		NA		NA	selenosis	0.000011		0.0000048	0.000015
			Strontium	NA		NA		NA	bone	0.000023		0.0000084	0.000032
			Uranium-234	3.E-09				3.E-09					
			Uranium-238	2.E-09				2.E-09					
			Chemical Total					5.E-08					0.003
		Exposure Point Total						5.E-08					0.003
	Exposure Medium Total							5.E-08					0.003
Medium Total								5.E-08					0.003
Receptor Total							Receptor Risk Total	5.E-08				Receptor HI Total	0.003

TABLE 9.80.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Clinch River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.000018		0.0000052	0.000023
			Arsenic	2.E-08		7.E-09		3.E-08	skin	0.00035		0.00011	0.00046
			Barium	NA		NA		NA	Kidney	0.000035		0.00015	0.00018
			Boron	NA		NA		NA	weight	0.000016		0.0000048	0.000021
			Chromium	NA		NA		NA	None	0.000033		0.00074	0.00077
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000048		0.0000014	0.0000062
			Iron	NA		NA		NA	Gastrointestinal tract	0.000035		0.000010	0.000045
			Manganese	NA		NA		NA	CNS	0.00028		0.0021	0.0023
			Molybdenum	NA		NA		NA	blood	0.000030		0.0000088	0.000039
			Nickel	NA		NA		NA	weight	0.0000062		0.0000091	0.000015
			Selenium	NA		NA		NA	selenosis	0.000016		0.0000061	0.000023
			Strontium	NA		NA		NA	bone	0.000036		0.000011	0.000047
			Uranium-234	1.E-09				1.E-09					
			Uranium-238	9.E-10				9.E-10					
			Chemical Total					3.E-08					0.004
		Exposure Point Total						3.E-08					0.004
	Exposure Medium Total							3.E-08					0.004
Medium Total								3.E-08					0.004
Receptor Total							Receptor Risk Total	3.E-08				Receptor HI Total	0.004

TABLE 9.81.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reference Reach											
			Chromium	NA				NA	None	0.062			0.062
			Cobalt	NA				NA	Thyroid	0.034			0.034
			Copper	NA				NA	Gastrointestinal tract	0.0068			0.0068
			Manganese	NA				NA	CNS	0.0012			0.0012
			Mercury (methyl)	NA				NA	Neurophysiological	1.6			1.6
			Nickel	NA				NA	weight	0.0045			0.0045
			Selenium	NA				NA	selenosis	0.086			0.086
			Strontium	NA				NA	bone	0.00043			0.00043
			Vanadium	NA				NA	Gastrointestinal tract	0.012			0.012
			Zinc	NA				NA	blood	0.029			0.029
			PCB-1254	4.E-05				4.E-05	eye	2.6			2.6
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	9.E-07				9.E-07	NA	NA			NA
			alpha-Chlordane	6.E-07				6.E-07	NA	0.0080			0.0080
			Heptachlor	5.E-06				5.E-06	liver	0.0053			0.0053
			Potassium-40	9.E-08				9.E-08					
			Thorium-230	8.E-09				8.E-09					
			Chemical Total					2.E-04					4
		Exposure Point Total						2.E-04					4
	Exposure Medium Total							2.E-04					4
Medium Total								2.E-04					4
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	4

TABLE 9.82.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reference Reach											
			Barium	NA				NA	Kidney	0.00057			0.00057
			Boron	NA				NA	weight	0.0018			0.0018
			Chromium	NA				NA	None	0.078			0.078
			Copper	NA				NA	Gastrointestinal tract	0.0047			0.0047
			Manganese	NA				NA	CNS	0.019			0.019
			Mercury (methyl)	NA				NA	Neurophysiological	0.91			0.91
			Nickel	NA				NA	weight	0.0052			0.0052
			Selenium	NA				NA	selenosis	0.10			0.10
			Strontium	NA				NA	bone	0.0030			0.0030
			Zinc	NA				NA	blood	0.039			0.039
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 9.83.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reference Reach											
			Barium	NA				NA	Kidney	0.00076			0.00076
			Cadmium	NA				NA	Kidney	0.029			0.029
			Cobalt	NA				NA	Thyroid	0.054			0.054
			Copper	NA				NA	Gastrointestinal tract	0.032			0.032
			Manganese	NA				NA	CNS	0.0062			0.0062
			Mercury (methyl)	NA				NA	Neurophysiological	1.4			1.4
			Nickel	NA				NA	weight	0.010			0.010
			Selenium	NA				NA	selenosis	0.043			0.043
			Strontium	NA				NA	bone	0.0056			0.0056
			Zinc	NA				NA	blood	0.020			0.020
			PCB-1254	1.E-04				1.E-04	eye	7.0			7.0
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.019			0.019
			alpha-Chlordane	2.E-06				2.E-06	NA	0.021			0.021
			gamma-Chlordane	9.E-07				9.E-07	NA	0.012			0.012
			Heptachlor	5.E-06				5.E-06	liver	0.0052			0.0052
			Potassium-40	1.E-07				1.E-07					
			Radium-226	2.E-08				2.E-08					
			Chemical Total					4.E-04					9
		Exposure Point Total						4.E-04					9
	Exposure Medium Total							4.E-04					9
Medium Total								4.E-04					9
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	9

TABLE 9.84.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Clinch River Reference Reach											
			Barium	NA				NA	Kidney	0.00020			0.00020
			Copper	NA				NA	Gastrointestinal tract	0.0038			0.0038
			Manganese	NA				NA	CNS	0.0023			0.0023
			Mercury (methyl)	NA				NA	Neurophysiological	1.7			1.7
			Selenium	NA				NA	selenosis	0.059			0.059
			Strontium	NA				NA	bone	0.0011			0.0011
			Zinc	NA				NA	blood	0.017			0.017
			Chemical Total					0.E+00					2
		Exposure Point Total						0.E+00					2
	Exposure Medium Total							0.E+00					2
Medium Total								0.E+00					2
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	2

TABLE 9.85.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reference Reach											
			Chromium	NA				NA	None	0.29			0.29
			Cobalt	NA				NA	Thyroid	0.16			0.16
			Copper	NA				NA	Gastrointestinal tract	0.032			0.032
			Manganese	NA				NA	CNS	0.0054			0.0054
			Mercury (methyl)	NA				NA	Neurophysiological	7.5			7.5
			Nickel	NA				NA	weight	0.021			0.021
			Selenium	NA				NA	selenosis	0.40			0.40
			Strontium	NA				NA	bone	0.0020			0.0020
			Vanadium	NA				NA	Gastrointestinal tract	0.056			0.056
			Zinc	NA				NA	blood	0.14			0.14
			PCB-1254	4.E-05				4.E-05	eye	12.			12.
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			4,4'-DDE	8.E-07				8.E-07	NA	NA			NA
			alpha-Chlordane	6.E-07				6.E-07	NA	0.037			0.037
			Heptachlor	5.E-06				5.E-06	liver	0.025			0.025
			Potassium-40	2.E-08				2.E-08					
			Thorium-230	2.E-09				2.E-09					
			Chemical Total					2.E-04					21
		Exposure Point Total						2.E-04					21
	Exposure Medium Total							2.E-04					21
Medium Total								2.E-04					21
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	21

TABLE 9.86.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reference Reach											
			Barium	NA				NA	Kidney	0.0026			0.0026
			Boron	NA				NA	weight	0.0083			0.0083
			Chromium	NA				NA	None	0.36			0.36
			Copper	NA				NA	Gastrointestinal tract	0.022			0.022
			Manganese	NA				NA	CNS	0.090			0.090
			Mercury (methyl)	NA				NA	Neurophysiological	4.2			4.2
			Nickel	NA				NA	weight	0.024			0.024
			Selenium	NA				NA	selenosis	0.47			0.47
			Strontium	NA				NA	bone	0.014			0.014
			Zinc	NA				NA	blood	0.18			0.18
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 9.87.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reference Reach											
			Barium	NA				NA	Kidney	0.0036			0.0036
			Cadmium	NA				NA	Kidney	0.14			0.14
			Cobalt	NA				NA	Thyroid	0.25			0.25
			Copper	NA				NA	Gastrointestinal tract	0.15			0.15
			Manganese	NA				NA	CNS	0.029			0.029
			Mercury (methyl)	NA				NA	Neurophysiological	6.7			6.7
			Nickel	NA				NA	weight	0.047			0.047
			Selenium	NA				NA	selenosis	0.20			0.20
			Strontium	NA				NA	bone	0.026			0.026
			Zinc	NA				NA	blood	0.094			0.094
			PCB-1254	1.E-04				1.E-04	eye	33.			33.
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.088			0.088
			alpha-Chlordane	1.E-06				1.E-06	NA	0.097			0.097
			gamma-Chlordane	9.E-07				9.E-07	NA	0.058			0.058
			Heptachlor	5.E-06				5.E-06	liver	0.024			0.024
			Potassium-40	2.E-08				2.E-08					
			Radium-226	5.E-09				5.E-09					
			Chemical Total					4.E-04					41
		Exposure Point Total						4.E-04					41
	Exposure Medium Total							4.E-04					41
Medium Total								4.E-04					41
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	41

TABLE 9.88.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Clinch River Reference Reach											
			Barium	NA				NA	Kidney	0.00093			0.00093
			Copper	NA				NA	Gastrointestinal tract	0.018			0.018
			Manganese	NA				NA	CNS	0.011			0.011
			Mercury (methyl)	NA				NA	Neurophysiological	8.1			8.1
			Selenium	NA				NA	selenosis	0.28			0.28
			Strontium	NA				NA	bone	0.0052			0.0052
			Zinc	NA				NA	blood	0.079			0.079
			Chemical Total					0.E+00					8
		Exposure Point Total						0.E+00					8
	Exposure Medium Total							0.E+00					8
Medium Total								0.E+00					8
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	8

TABLE 9.89.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reach B	Aluminum	NA		NA		NA	Neurological	0.0046		0.000024	0.0046
			Arsenic	1.E-05		7.E-08		1.E-05	skin	0.089		0.00046	0.089
			Barium	NA		NA		NA	Kidney	0.0045		0.000024	0.0046
			Beryllium	NA		NA		NA	intestinal tract	0.0066		0.000034	0.0066
			Boron	NA		NA		NA	weight	0.0022		0.000012	0.0023
			Chromium	NA		NA		NA	None	0.0039		0.000020	0.0039
			Copper	NA		NA		NA	Gastrointestinal tract	0.00092		0.0000048	0.00092
			Iron	NA		NA		NA	Gastrointestinal tract	0.0064		0.000034	0.0065
			Manganese	NA		NA		NA	CNS	0.079		0.00041	0.079
			Molybdenum	NA		NA		NA	blood	0.0030		0.000016	0.0030
			Nickel	NA		NA		NA	weight	0.0015		0.0000016	0.0015
			Strontium	NA		NA		NA	bone	0.0042		0.000022	0.0042
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0084		0.000044	0.0084
			Radium-226	7.E-06				7.E-06					
			Thorium-230	8.E-07				8.E-07					
			Chemical Total					2.E-05					0.2
		Exposure Point Total						2.E-05					0.2
	Exposure Medium Total							2.E-05					0.2
Medium Total								2.E-05					0.2
Receptor Total							Receptor Risk Total	2.E-05				Receptor HI Total	0.2

TABLE 9.90.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reach B	Aluminum	NA		NA		NA	Neurological	0.011		0.000070	0.011
			Arsenic	8.E-06		5.E-08		8.E-06	skin	0.21		0.0014	0.21
			Barium	NA		NA		NA	Kidney	0.011		0.000070	0.011
			Beryllium	NA		NA		NA	intestinal tract	0.015		0.00010	0.015
			Boron	NA		NA		NA	weight	0.0052		0.000035	0.0053
			Chromium	NA		NA		NA	None	0.0092		0.000060	0.0092
			Copper	NA		NA		NA	Gastrointestinal tract	0.0021		0.000014	0.0022
			Iron	NA		NA		NA	Gastrointestinal tract	0.015		0.000099	0.015
			Manganese	NA		NA		NA	CNS	0.18		0.0012	0.19
			Molybdenum	NA		NA		NA	blood	0.0070		0.000047	0.0071
			Nickel	NA		NA		NA	weight	0.0036		0.0000048	0.0036
			Strontium	NA		NA		NA	bone	0.0098		0.000065	0.0099
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.020		0.00013	0.020
			Radium-226	9.E-07				9.E-07					
			Thorium-230	1.E-07				1.E-07					
			Chemical Total					9.E-06					0.5
		Exposure Point Total						9.E-06					0.5
	Exposure Medium Total							9.E-06					0.5
Medium Total								9.E-06					0.5
Receptor Total							Receptor Risk Total	9.E-06				Receptor HI Total	0.5

TABLE 9.91.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reach B	Aluminum	NA		NA		NA	Neurological	0.000021		0.0000074	0.000028
			Arsenic	6.E-08		2.E-08		8.E-08	skin	0.00040		0.00015	0.00055
			Barium	NA		NA		NA	Kidney	0.000020		0.00010	0.00013
			Beryllium	NA		NA		NA	intestinal tract	0.000030		0.0015	0.0016
			Boron	NA		NA		NA	weight	0.000010		0.0000036	0.000014
			Chromium	NA		NA		NA	None	0.000018		0.00049	0.00051
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000041		0.0000015	0.0000056
			Iron	NA		NA		NA	Gastrointestinal tract	0.000029		0.000010	0.000039
			Manganese	NA		NA		NA	CNS	0.00036		0.0032	0.0036
			Molybdenum	NA		NA		NA	blood	0.000014		0.0000049	0.000018
			Nickel	NA		NA		NA	weight	0.0000070		0.000013	0.000020
			Strontium	NA		NA		NA	bone	0.000019		0.0000068	0.000026
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000038		0.00052	0.00056
			Radium-226	3.E-08				3.E-08					
			Thorium-230	4.E-09				4.E-09					
			Chemical Total					1.E-07					0.007
		Exposure Point Total						1.E-07					0.007
	Exposure Medium Total							1.E-07					0.007
Medium Total								1.E-07					0.007
Receptor Total							Receptor Risk Total	1.E-07				Receptor HI Total	0.007

TABLE 9.92.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Trespasser
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reach B	Aluminum	NA		NA		NA	Neurological	0.000032		0.0000094	0.000041
			Arsenic	4.E-08		9.E-08		1.E-07	skin	0.00062		0.00019	0.00081
			Barium	NA		NA		NA	Kidney	0.000032		0.00013	0.00016
			Beryllium	NA		NA		NA	intestinal tract	0.000046		0.0019	0.0020
			Boron	NA		NA		NA	weight	0.000016		0.0000046	0.000020
			Chromium	NA		NA		NA	None	0.000027		0.00062	0.00065
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000064		0.0000019	0.0000083
			Iron	NA		NA		NA	Gastrointestinal tract	0.000045		0.000013	0.000058
			Manganese	NA		NA		NA	CNS	0.00055		0.0041	0.0046
			Molybdenum	NA		NA		NA	blood	0.000021		0.0000062	0.000027
			Nickel	NA		NA		NA	weight	0.000011		0.000016	0.000027
			Strontium	NA		NA		NA	bone	0.000029		0.0000086	0.000038
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000059		0.00066	0.00072
			Radium-226	1.E-08				1.E-08					
			Thorium-230	1.E-09				1.E-09					
			Chemical Total					1.E-07					0.009
		Exposure Point Total						1.E-07					0.009
	Exposure Medium Total							1.E-07					0.009
Medium Total								1.E-07					0.009
Receptor Total							Receptor Risk Total	1.E-07				Receptor HI Total	0.009

TABLE 9.93.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.0042		0.0000	0.0042
			Arsenic	1.E-05		6.E-08		1.E-05	skin	0.081		0.0000	0.081
			Barium	NA		NA		NA	Kidney	0.0046		0.0000	0.0046
			Boron	NA		NA		NA	weight	0.0023		0.0000	0.0023
			Chromium	NA		NA		NA	None	0.0035		0.0000	0.0035
			Copper	NA		NA		NA	Gastrointestinal tract	0.00067		0.0000	0.00067
			Iron	NA		NA		NA	Gastrointestinal tract	0.0066		0.0000	0.0066
			Manganese	NA		NA		NA	CNS	0.075		0.0000	0.075
			Molybdenum	NA		NA		NA	blood	0.0032		0.0000	0.0032
			Nickel	NA		NA		NA	weight	0.00068		0.0000	0.00068
			Selenium	NA		NA		NA	selenosis	0.0025		0.0000	0.0025
			Strontium	NA		NA		NA	bone	0.0044		0.0000	0.0044
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.0067		0.0000	0.0067
			Uranium-234	4.E-07				4.E-07					
			Chemical Total					1.E-05					0.2
		Exposure Point Total						1.E-05					0.2
	Exposure Medium Total							1.E-05					0.2
Medium Total								1.E-05					0.2
Receptor Total							Receptor Risk Total	1.E-05				Receptor HI Total	0.2

TABLE 9.94.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.0097		0.000064	0.0098
			Arsenic	7.E-06		5.E-08		7.E-06	skin	0.19		0.0012	0.19
			Barium	NA		NA		NA	Kidney	0.011		0.000071	0.011
			Boron	NA		NA		NA	weight	0.0053		0.000035	0.0053
			Chromium	NA		NA		NA	None	0.0081		0.000053	0.0082
			Copper	NA		NA		NA	Gastrointestinal tract	0.0016		0.000010	0.0016
			Iron	NA		NA		NA	Gastrointestinal tract	0.015		0.00010	0.016
			Manganese	NA		NA		NA	CNS	0.17		0.0011	0.18
			Molybdenum	NA		NA		NA	blood	0.0074		0.000049	0.0075
			Nickel	NA		NA		NA	weight	0.0016		0.0000021	0.0016
			Selenium	NA		NA		NA	selenosis	0.0058		0.000038	0.0058
			Strontium	NA		NA		NA	bone	0.010		0.000068	0.010
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.016		0.00010	0.016
			Uranium-234	5.E-08				5.E-08					
			Chemical Total					7.E-06					0.5
		Exposure Point Total						7.E-06					0.5
	Exposure Medium Total							7.E-06					0.5
Medium Total								7.E-06					0.5
Receptor Total							Receptor Risk Total	7.E-06				Receptor HI Total	0.5

TABLE 9.95.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.000019		0.0000067	0.000025
			Arsenic	6.E-08		2.E-08		8.E-08	skin	0.00036		0.00014	0.00050
			Barium	NA		NA		NA	Kidney	0.000021		0.00011	0.00013
			Boron	NA		NA		NA	weight	0.000010		0.0000037	0.000014
			Chromium	NA		NA		NA	None	0.000016		0.00043	0.00045
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000030		0.0000011	0.0000041
			Iron	NA		NA		NA	Gastrointestinal tract	0.000030		0.000011	0.000040
			Manganese	NA		NA		NA	CNS	0.00034		0.0030	0.0034
			Molybdenum	NA		NA		NA	blood	0.000014		0.0000051	0.000019
			Nickel	NA		NA		NA	weight	0.0000030		0.0000055	0.0000085
			Selenium	NA		NA		NA	selenosis	0.000011		0.0000050	0.000016
			Strontium	NA		NA		NA	bone	0.000020		0.0000072	0.000027
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000030		0.00042	0.00045
			Uranium-234	2.E-09				2.E-09					
			Chemical Total					8.E-08					0.005
		Exposure Point Total						8.E-08					0.005
	Exposure Medium Total							8.E-08					0.005
Receptor Total							Receptor Risk Total	8.E-08				Receptor HI Total	0.005

TABLE 9.96.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Tennessee River Reference Reach	Aluminum	NA		NA		NA	Neurological	0.000029		0.0000086	0.000038
			Arsenic	4.E-08		1.E-08		5.E-08	skin	0.00056		0.00017	0.00074
			Barium	NA		NA		NA	Kidney	0.000032		0.00013	0.00017
			Boron	NA		NA		NA	weight	0.000016		0.0000047	0.000021
			Chromium	NA		NA		NA	None	0.000024		0.00055	0.00057
			Copper	NA		NA		NA	Gastrointestinal tract	0.0000047		0.0000014	0.0000060
			Iron	NA		NA		NA	Gastrointestinal tract	0.000046		0.000014	0.000060
			Manganese	NA		NA		NA	CNS	0.00052		0.0038	0.0044
			Molybdenum	NA		NA		NA	blood	0.000022		0.0000065	0.000029
			Nickel	NA		NA		NA	weight	0.0000047		0.0000069	0.000012
			Selenium	NA		NA		NA	selenosis	0.000017		0.0000063	0.000024
			Strontium	NA		NA		NA	bone	0.000031		0.0000091	0.000040
			Vanadium	NA		NA		NA	Gastrointestinal tract	0.000047		0.00053	0.00058
			Uranium-234	8.E-10				8.E-10					
			Chemical Total					5.E-08					0.007
		Exposure Point Total						5.E-08					0.007
	Exposure Medium Total							5.E-08					0.007
Medium Total								5.E-08					0.007
Receptor Total							Receptor Risk Total	5.E-08				Receptor HI Total	0.007

TABLE 10.1.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach A	Arsenic	2.E-06				2.E-06	skin	0.012			0.012
			Mercury (methyl)	NA				NA	Neuropsychological	2.6			2.6
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.11			0.11
			Chemical Total					1.E-04					3
		Exposure Point Total						1.E-04					3
	Exposure Medium Total							1.E-04					3
Medium Total								1.E-04					3
Receptor Total							Receptor Risk Total	1.E-04				Receptor HI Total	3

TABLE 10.2.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach A	Mercury (methyl)	NA				NA	Neuropsychological	0.86			0.86
			Selenium	NA				NA	selenosis	0.14			0.14
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.3.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach A	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.014			0.014
			alpha-Chlordane	1.E-06				1.E-06	NA	0.013			0.013
			Arsenic	4.E-06				4.E-06	skin	0.022			0.022
			Copper	NA				NA	Gastrointestinal tract	0.10			0.10
			Mercury (methyl)	NA				NA	Neuropsychological	1.0			1.0
			PCB-1254	8.E-05				8.E-05	eye	4.5			4.5
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			Chemical Total					3.E-04					6
		Exposure Point Total						3.E-04					6
	Exposure Medium Total							3.E-04					6
Medium Total								3.E-04					6
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	6

TABLE 10.4.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach A	Mercury (methyl)	NA				NA	Neuropsychological	1.1			1.1
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.5.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach A	Arsenic	2.E-06				2.E-06	skin	0.058			0.058
			Mercury (methyl)	NA				NA	Neuropsychological	12.			12.
			PCB-1260	9.E-05				9.E-05	NA	NA			NA
			Selenium	NA				NA	selenosis	0.50			0.50
			Zinc	NA				NA	blood	0.15			0.15
			Chemical Total					9.E-05					13
		Exposure Point Total						9.E-05					13
	Exposure Medium Total							9.E-05					13
Medium Total								9.E-05					13
Receptor Total							Receptor Risk Total	9.E-05				Receptor HI Total	13

TABLE 10.9.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach B	Mercury (methyl)	NA				NA	Neuropsychological	1.5			1.5
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.11			0.11
			Chemical Total					1.E-04					2
		Exposure Point Total						1.E-04					2
	Exposure Medium Total							1.E-04					2
Medium Total								1.E-04					2
Receptor Total							Receptor Risk Total	1.E-04				Receptor HI Total	2

TABLE 10.10.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach B	Mercury (methyl)	NA				NA	Neuropsychological	0.78			0.78
			Selenium	NA				NA	selenosis	0.13			0.13
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.11.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach B	4,4'-DDE	1.E-06				1.E-06	NA	NA			NA
			Mercury (methyl)	NA				NA	Neuropsychological	1.0			1.0
			PCB-1254	6.E-05				6.E-05	eye	3.6			3.6
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			Chemical Total					3.E-04					5
		Exposure Point Total						3.E-04					5
	Exposure Medium Total							3.E-04					5
Medium Total								3.E-04					5
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	5

TABLE 10.12.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach B	Mercury (methyl)	NA				NA	Neuropsychological	1.6			1.6
			Chemical Total					0.E+00					2
		Exposure Point Total						0.E+00					2
	Exposure Medium Total							0.E+00					2
Medium Total								0.E+00					2
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	2

TABLE 10.13.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach B											
			Cobalt	NA				NA	Thyroid	0.19			0.19
			Copper	NA				NA	Gastrointestinal tract	0.28			0.28
			Mercury (methyl)	NA				NA	Neuropsychological	6.8			6.8
			Nickel	NA				NA	weight	0.13			0.13
			Selenium	NA				NA	selenosis	0.53			0.53
			Zinc	NA				NA	blood	0.13			0.13
			Chemical Total					9.E-05					8
		Exposure Point Total						9.E-05					8
	Exposure Medium Total							9.E-05					8
Medium Total								9.E-05					8
Receptor Total							Receptor Risk Total	9.E-05				Receptor HI Total	8

TABLE 10.14.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach B											
			Chromium	NA				NA	None	0.17			0.17
			Cobalt	NA				NA	Thyroid	0.18			0.18
			Mercury (methyl)	NA				NA	Neuropsychological	3.6			3.6
			Selenium	NA				NA	selenosis	0.61			0.61
			Zinc	NA				NA	blood	0.15			0.15
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 10.15.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach B	4,4'-DDE	1.E-06				1.E-06	NA	NA			NA
			Cobalt	NA				NA	Thyroid	0.29			0.29
			Mercury (methyl)	NA				NA	Neuropsychological	4.9			4.9
			PCB-1254	6.E-05				6.E-05	eye	17.			17.
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.28			0.28
			Chemical Total					2.E-04					22
		Exposure Point Total						2.E-04					22
	Exposure Medium Total							2.E-04					22
Medium Total								2.E-04					22
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	22

TABLE 10.16.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reach B											
			Copper	NA				NA	Gastrointestinal tract	0.23			0.23
			Mercury (methyl)	NA				NA	Neuropsychological	7.6			7.6
			Selenium	NA				NA	selenosis	0.44			0.44
			Zinc	NA				NA	blood	0.10			0.10
			Chemical Total					0.E+00					8
		Exposure Point Total						0.E+00					8
	Exposure Medium Total							0.E+00					8
Medium Total								0.E+00					8
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	8

TABLE 10.17.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach C	Arsenic	3.E-05		2.E-07		3.E-05	skin	0.21		0.0011	0.21
			Radium-228	1.E-04				1.E-04					
			Chemical Total					2.E-04					0.5
		Exposure Point Total						2.E-04					0.5
	Exposure Medium Total							2.E-04					0.5
Medium Total								2.E-04					0.5
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	0.5

TABLE 10.18.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Emory River Reach C	Arsenic						skin	0.48		0.0032	0.49
			Manganese						CNS	0.47		0.0031	0.47
			Chemical Total										1
		Exposure Point Total											1
	Exposure Medium Total												1
Medium Total													1
Receptor Total							Receptor Risk Total					Receptor HI Total	1

TABLE 10.19.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach C	4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.020			0.020
			alpha-Chlordane	1.E-06				1.E-06	NA	0.014			0.014
			Heptachlor	6.E-06				6.E-06	liver	0.0059			0.0059
			Mercury (methyl)	NA				NA	Neurophysiological	1.7			1.7
			PCB-1254	1.E-04				1.E-04	eye	7.9			7.9
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			Chemical Total					5.E-04					10
		Exposure Point Total						5.E-04					10
	Exposure Medium Total							5.E-04					10
Medium Total								5.E-04					10
Receptor Total							Receptor Risk Total	5.E-04				Receptor HI Total	10

TABLE 10.20.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach C	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.030			0.030
			Mercury (methyl)	NA				NA	Neurophysiological	1.7			1.7
			PCB-1260	7.E-04				7.E-04	NA	NA			NA
			Chemical Total					7.E-04					2
		Exposure Point Total						7.E-04					2
	Exposure Medium Total							7.E-04					2
Medium Total								7.E-04					2
Receptor Total							Receptor Risk Total	7.E-04				Receptor HI Total	2

TABLE 10.21.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reach C	4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.093			0.093
			alpha-Chlordane	1.E-06				1.E-06	NA	0.065			0.065
			Chromium	NA				NA	None	0.16			0.16
			Copper	NA				NA	Gastrointestinal tract	0.25			0.25
			Heptachlor	5.E-06				5.E-06	liver	0.028			0.028
			Mercury (methyl)	NA				NA	Neurophysiological	7.7			7.7
			PCB-1254	1.E-04				1.E-04	eye	37.			37.
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			Zinc	NA				NA	blood	0.13			0.13
			Chemical Total					4.E-04					46
		Exposure Point Total						4.E-04					46
	Exposure Medium Total							4.E-04					46
Medium Total								4.E-04					46
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	46

TABLE 10.22.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reach C											
			Cobalt	NA				NA	Thyroid	0.25			0.25
			Mercury (methyl)	NA				NA	Neurophysiological	2.5			2.5
			Selenium	NA				NA	selenosis	0.42			0.42
			Zinc	NA				NA	blood	0.17			0.17
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 10.23.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reach C	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.14			0.14
			Cobalt	NA				NA	Thyroid	0.40			0.40
			Mercury (methyl)	NA				NA	Neurophysiological	8.1			8.1
			PCB-1260	7.E-04				7.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.19			0.19
			Zinc	NA				NA	blood	0.10			0.10
			Chemical Total					7.E-04					9
		Exposure Point Total						7.E-04					9
	Exposure Medium Total							7.E-04					9
Medium Total								7.E-04					9
Receptor Total							Receptor Risk Total	7.E-04				Receptor HI Total	9

TABLE 10.24.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reference Reach	Mercury (methyl)	NA				NA	Neurophysiological	1.9			1.9
			PCB-1260	7.E-05				7.E-05	NA	NA			NA
			Chemical Total					7.E-05					2
		Exposure Point Total						7.E-05					2
	Exposure Medium Total							7.E-05					2
Medium Total								7.E-05					2
Receptor Total							Receptor Risk Total	7.E-05				Receptor HI Total	2

TABLE 10.25.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reference Reach	Chromium	NA				NA	None	0.17			0.17
			Mercury (methyl)	NA				NA	Neurophysiological	0.94			0.94
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1

TABLE 10.26.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reference Reach	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.016			0.016
			alpha-Chlordane	1.E-06				1.E-06	NA	0.014			0.014
			Mercury (methyl)	NA				NA	Neurophysiological	1.8			1.8
			PCB-1254	9.E-05				9.E-05	eye	5.2			5.2
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			Chemical Total					4.E-04					7
		Exposure Point Total						4.E-04					7
	Exposure Medium Total							4.E-04					7
Medium Total								4.E-04					7
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	7

TABLE 10.27.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Emory River Reference Reach	Mercury (methyl)	NA				NA	Neurophysiological	8.9			8.9
			PCB-1260	6.E-05				6.E-05	NA	NA			NA
			Selenium	NA				NA	selenosis	0.34			0.34
			Zinc	NA				NA	blood	0.13			0.13
			Chemical Total					6.E-05					9
		Exposure Point Total						6.E-05					9
	Exposure Medium Total							6.E-05					9
Medium Total								6.E-05					9
Receptor Total							Receptor Risk Total	6.E-05				Receptor HI Total	9

TABLE 10.28.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Emory River Reference Reach	Chromium	NA				NA	None	0.77			0.77
			Mercury (methyl)	NA				NA	Neurophysiological	4.4			4.4
			Selenium	NA				NA	selenosis	0.42			0.42
			Chemical Total					0.E+00					6
		Exposure Point Total						0.E+00					6
	Exposure Medium Total							0.E+00					6
Medium Total								0.E+00					6
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	6

TABLE 10.29.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Emory River Reference Reach	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.074			0.074
			alpha-Chlordane	1.E-06				1.E-06	NA	0.064			0.064
			Mercury (methyl)	NA				NA	Neurophysiological	8.2			8.2
			PCB-1254	8.E-05				8.E-05	eye	24.			24.
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.18			0.18
			Chemical Total					4.E-04					33
		Exposure Point Total						4.E-04					33
	Exposure Medium Total							4.E-04					33
Medium Total								4.E-04					33
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	33

TABLE 10.30.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Emory River Reference Reach											
			Chromium	NA				NA	None	0.17			0.17
			Mercury (methyl)	NA				NA	Neurophysiological	3.4			3.4
			Selenium	NA				NA	selenosis	0.26			0.26
			Zinc	NA				NA	blood	0.23			0.23
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 10.31.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Little Emory River	Mercury (methyl)	NA				NA	Neurophysiological	0.90			0.90
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.32.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Little Emory River	Mercury (methyl)	NA				NA	Neurophysiological	1.2			1.2
			Chemical Total					NA					1
		Exposure Point Total						NA					1
	Exposure Medium Total							NA					1
Medium Total								NA					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.33.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Little Emory River	Mercury (methyl)	NA				NA	Neurophysiological	0.96			0.96
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.34.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Little Emory River	Mercury (methyl)	NA				NA	Neurophysiological	4.2			4.2
			Selenium	NA				NA	selenosis	0.38			0.38
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 10.35.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Little Emory River											
			Chromium	NA				NA	None	0.18			0.18
			Mercury (methyl)	NA				NA	Neurophysiological	3.2			3.2
			Selenium	NA				NA	selenosis	0.45			0.45
			Zinc	NA				NA	blood	0.19			0.19
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 10.36.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Little Emory River	Mercury (methyl)	NA				NA	Neurophysiological	5.5			5.5
			Selenium	NA				NA	selenosis	0.23			0.23
			Chemical Total					0.E+00					6
		Exposure Point Total						0.E+00					6
	Exposure Medium Total							0.E+00					6
Medium Total								0.E+00					6
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	6

TABLE 10.37.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Little Emory River											
			Chromium	NA				NA	None	0.27			0.27
			Mercury (methyl)	NA				NA	Neurophysiological	4.5			4.5
			Selenium	NA				NA	selenosis	0.32			0.32
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 10.38.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach A	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			Mercury (methyl)	NA				NA	Neurophysiological	2.2			2.2
			PCB-1254	5.E-05				5.E-05	eye	3.1			3.1
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.11			0.11
			Chemical Total					2.E-04					5
		Exposure Point Total						2.E-04					5
	Exposure Medium Total							2.E-04					5
Medium Total								2.E-04					5
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	5

TABLE 10.39.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach A	Mercury (methyl)	NA				NA	Neurophysiological	0.77			0.77
			Selenium	NA				NA	selenosis	0.17			0.17
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.40.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach A	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			alpha-Chlordane	1.E-06				1.E-06	NA	0.013			0.013
			Mercury (methyl)	NA				NA	Neurophysiological	1.1			1.1
			PCB-1254	7.E-05				7.E-05	eye	4.0			4.0
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Chemical Total					2.E-04					5
		Exposure Point Total						2.E-04					5
	Exposure Medium Total							2.E-04					5
Medium Total								2.E-04					5
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	5

TABLE 10.41.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Receptor Age:

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach A	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			Mercury (methyl)	NA				NA	Neurophysiological	10.			10.
			PCB-1254	5.E-05				5.E-05	eye	14.			14.
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.50			0.50
			Zinc	NA				NA	blood	0.15			0.15
			Chemical Total					2.E-04					25
		Exposure Point Total						2.E-04					25
	Exposure Medium Total							2.E-04					25
Medium Total								2.E-04					25
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	25

TABLE 10.42.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach A											
			Cobalt	NA				NA	Thyroid	0.18			0.18
			Mercury (methyl)	NA				NA	Neurophysiological	3.6			3.6
			Selenium	NA				NA	selenosis	0.81			0.81
			Zinc	NA				NA	blood	0.19			0.19
			Chemical Total					0.E+00					5
		Exposure Point Total						0.E+00					5
	Exposure Medium Total							0.E+00					5
Medium Total								0.E+00					5
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	5

TABLE 10.43.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach A	4,4'-DDE	1.E-06				1.E-06	NA	NA			NA
			Chromium	NA				NA	None	0.23			0.23
			Copper	NA				NA	Gastrointestinal tract	0.32			0.32
			Mercury (methyl)	NA				NA	Neurophysiological	5.2			5.2
			PCB-1254	6.E-05				6.E-05	eye	19.			19.
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.34			0.34
			Chemical Total					2.E-04					25
		Exposure Point Total						2.E-04					25
	Exposure Medium Total							2.E-04					25
Medium Total								2.E-04					25
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	25

TABLE 10.44.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Clinch River Reach A											
			Chromium	NA				NA	None	0.14			0.14
			Mercury (methyl)	NA				NA	Neurophysiological	2.6			2.6
			Selenium	NA				NA	selenosis	0.21			0.21
			Chemical Total					0.E+00					3
		Exposure Point Total						0.E+00					3
	Exposure Medium Total							0.E+00					3
Medium Total								0.E+00					3
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	3

TABLE 10.45.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach B	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.019			0.019
			Heptachlor	5.E-06				5.E-06	liver	0.0050			0.0050
			Mercury (methyl)	NA				NA	Neurophysiological	1.3			1.3
			PCB-1254	8.E-05				8.E-05	eye	4.7			4.7
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.11			0.11
			Chemical Total					3.E-04					6
		Exposure Point Total						3.E-04					6
	Exposure Medium Total							3.E-04					6
Medium Total								3.E-04					6
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	6

TABLE 10.46.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach B	4,4'-DDE	4.E-06				4.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.024			0.024
			Mercury (methyl)	NA				NA	Neurophysiological	2.4			2.4
			PCB-1260	5.E-04				5.E-04	NA	NA			NA
			Chemical Total					5.E-04					3
		Exposure Point Total						5.E-04					3
	Exposure Medium Total							5.E-04					3
Medium Total								5.E-04					3
Receptor Total							Receptor Risk Total	5.E-04				Receptor HI Total	3

TABLE 10.47.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reach B	4,4'-DDE	2.E-06				2.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.090			0.090
			Cobalt	NA				NA	Thyroid	0.20			0.20
			Copper	NA				NA	Gastrointestinal tract	0.39			0.39
			Heptachlor	5.E-06				5.E-06	liver	0.023			0.023
			Mercury (methyl)	NA				NA	Neurophysiological	6.0			6.0
			PCB-1254	8.E-05				8.E-05	eye	22.			22.
			PCB-1260	2.E-04				2.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.49			0.49
			Zinc	NA				NA	blood	0.14			0.14
			Chemical Total					3.E-04					29
		Exposure Point Total						3.E-04					29
	Exposure Medium Total							3.E-04					29
Medium Total								3.E-04					29
Receptor Total							Receptor Risk Total	3.E-04				Receptor HI Total	29

TABLE 10.48.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reach B	Mercury (methyl)	NA				NA	Neurophysiological	3.1			3.1
			Selenium	NA				NA	selenosis	0.73			0.73
			Zinc	NA				NA	blood	0.17			0.17
			Chemical Total					0.E+00					4
		Exposure Point Total						0.E+00					4
	Exposure Medium Total							0.E+00					4
Medium Total								0.E+00					4
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	4

TABLE 10.49.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reach B	4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	2.E-06				2.E-06	liver	0.11			0.11
			Cobalt	NA				NA	Thyroid	0.22			0.22
			Copper	NA				NA	Gastrointestinal tract	0.11			0.11
			Mercury (methyl)	NA				NA	Neurophysiological	11.			11.
			PCB-1260	4.E-04				4.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.23			0.23
			Zinc	NA				NA	blood	0.10			0.10
			Chemical Total					5.E-04					12
		Exposure Point Total						5.E-04					12
	Exposure Medium Total							5.E-04					12
Medium Total								5.E-04					12
Receptor Total							Receptor Risk Total	5.E-04				Receptor HI Total	12

TABLE 10.50.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reference Reach											
			Heptachlor	5.E-06				5.E-06	liver	0.0053			0.0053
			Mercury (methyl)	NA				NA	Neurophysiological	1.6			1.6
			PCB-1254	4.E-05				4.E-05	eye	2.6			2.6
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Chemical Total					2.E-04					4
		Exposure Point Total						2.E-04					4
	Exposure Medium Total							2.E-04					4
Medium Total								2.E-04					4
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	4

TABLE 10.51.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sunfish	Sunfish	Clinch River Reference Reach	Mercury (methyl)	NA				NA	Neurophysiological	0.91			0.91
			Selenium	NA				NA	selenosis	0.10			0.10
			Chemical Total					0.E+00					1
		Exposure Point Total						0.E+00					1
	Exposure Medium Total							0.E+00					1
Medium Total								0.E+00					1
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	1

TABLE 10.52.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Catfish	Catfish	Clinch River Reference Reach	4,4'-DDE	3.E-06				3.E-06	NA	NA			NA
			4,4'-DDT	1.E-06				1.E-06	liver	0.019			0.019
			alpha-Chlordane	2.E-06				2.E-06	NA	0.021			0.021
			Heptachlor	5.E-06				5.E-06	liver	0.0052			0.0052
			Mercury (methyl)	NA				NA	Neurophysiological	1.4			1.4
			PCB-1254	1.E-04				1.E-04	eye	7.0			7.0
			PCB-1260	3.E-04				3.E-04	NA	NA			NA
			Chemical Total					4.E-04					9
		Exposure Point Total						4.E-04					9
	Exposure Medium Total							4.E-04					9
Medium Total								4.E-04					9
Receptor Total							Receptor Risk Total	4.E-04				Receptor HI Total	9

TABLE 10.53.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Crappie	Crappie	Clinch River Reference Reach	Mercury (methyl)	NA				NA	Neurophysiological	1.7			1.7
			Chemical Total					0.E+00					2
		Exposure Point Total						0.E+00					2
	Exposure Medium Total							0.E+00					2
Medium Total								0.E+00					2
Receptor Total							Receptor Risk Total	0.E+00				Receptor HI Total	2

TABLE 10.54.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Kingston Ash Recovery Project

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Bass	Bass	Clinch River Reference Reach											
			Chromium	NA				NA	None	0.29			0.29
			Cobalt	NA				NA	Thyroid	0.16			0.16
			Heptachlor	5.E-06				5.E-06	liver	0.025			0.025
			Mercury (methyl)	NA				NA	Neurophysiological	7.5			7.5
			PCB-1254	4.E-05				4.E-05	eye	12.			12.
			PCB-1260	1.E-04				1.E-04	NA	NA			NA
			Selenium	NA				NA	selenosis	0.40			0.40
			Zinc	NA				NA	blood	0.14			0.14
			Chemical Total					2.E-04					21
		Exposure Point Total						2.E-04					21
	Exposure Medium Total							2.E-04					21
Medium Total								2.E-04					21
Receptor Total							Receptor Risk Total	2.E-04				Receptor HI Total	21

APPENDIX C

Supporting Tables - Dermal Absorption Calculations

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	1.6E-07	5.6E-06	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.3E-09	4.5E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	4.15E-05	4.2E-08	1.5E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	2.21E-05	2.2E-08	8.0E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	4.6E-10	1.7E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	1.6E-09	5.8E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.17E-04	1.2E-07	4.2E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	3.11E-05	3.1E-08	1.1E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	8.92E-07	8.9E-10	3.2E-08	6%	5.50%	N	0.00%
Mercury	1.0E-03	experimental	2.30E-07	2.3E-10	8.3E-09	7%	4.71%	N	0.00%
Nickel	2.0E-04	experimental	5.83E-07	1.2E-10	4.2E-09	4%	1.65%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	7.6E-10	2.7E-08	30%	1.10%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.2E-07	4.3E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	1.3E-07	4.5E-06	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.3E-09	4.5E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	3.95E-05	4.0E-08	1.4E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	1.96E-05	2.0E-08	7.1E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	3.9E-10	1.4E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	1.8E-09	6.6E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.19E-04	1.2E-07	4.3E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	3.42E-05	3.4E-08	1.2E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	9.27E-07	9.3E-10	3.4E-08	6%	5.50%	N	0.00%
Nickel	2.0E-04	experimental	5.43E-07	1.1E-10	3.9E-09	4%	1.65%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	3.8E-10	1.4E-08	30%	1.10%	N	0.00%
Strontium	1.0E-03	default	1.15E-04	1.2E-07	4.2E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	9.2E-08	3.3E-06	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	5.5E-10	2.0E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	3.62E-05	3.6E-08	1.3E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	1.70E-05	1.7E-08	6.1E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	5.1E-10	1.8E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	1.0E-09	3.6E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.26E-04	1.3E-07	4.6E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	3.51E-05	3.5E-08	1.3E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	7.84E-07	7.8E-10	2.8E-08	6%	5.50%	N	0.00%
Nickel	2.0E-04	experimental	6.50E-07	1.3E-10	4.7E-09	4%	1.65%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	4.3E-10	1.6E-08	30%	1.10%	N	0.00%
Strontium	1.0E-03	default	1.14E-04	1.1E-07	4.1E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	1.5E-07	3.8E-05	15%	2.20%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	4.2E-10	1.1E-07	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	1.7E-09	4.3E-07	95%	0.35%	N	0.00%
Barium	1.0E-03	default	4.28E-05	4.3E-08	1.1E-05	7%	4.71%	N	0.00%
Boron	1.0E-03	default	2.24E-05	2.2E-08	5.7E-06	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	8.4E-10	2.1E-07	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	1.7E-09	4.3E-07	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.21E-04	1.2E-07	3.1E-05	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	3.16E-05	3.2E-08	8.0E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	1.11E-06	1.1E-09	2.8E-07	6%	5.50%	N	0.00%
Mercury	1.0E-03	experimental	1.90E-07	1.9E-10	4.8E-08	7%	4.71%	N	0.00%
Nickel	2.0E-04	experimental	5.52E-07	1.1E-10	2.8E-08	4%	1.65%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	4.8E-10	1.2E-07	30%	1.10%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.2E-07	3.0E-05	100%	0.33%	N	0.00%
Vanadium	1.0E-03	default	2.08E-06	2.1E-09	5.3E-07	2.6%	12.69%	Y	0.00%
Zinc	6.0E-04	experimental	1.37E-05	8.2E-09	2.1E-06	highly variable			

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	9.50E-05	9.5E-08	3.4E-06	6%	5.50%	N	0.00%
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	2.2E-07	7.9E-06	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	2.3E-09	8.2E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	5.37E-05	5.4E-08	1.9E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	2.16E-05	2.2E-08	7.8E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	4.7E-10	1.7E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	9.0E-10	3.3E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	2.27E-04	2.3E-07	8.2E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	1.77E-04	1.8E-07	6.4E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	9.86E-07	9.9E-10	3.6E-08	6%	5.50%	N	0.00%
Nickel	2.0E-04	experimental	6.95E-07	1.4E-10	5.0E-09	4%	1.65%	N	0.00%
Strontium	1.0E-03	default	1.11E-04	1.1E-07	4.0E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	8.9E-10	3.2E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	5.05E-05	5.1E-08	1.8E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	1.89E-05	1.9E-08	6.8E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	4.1E-10	1.5E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	5.0E-10	1.8E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.06E-04	1.1E-07	3.8E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	1.28E-04	1.3E-07	4.6E-06	6%	5.50%	N	0.00%
Mercury	1.0E-03	experimental	1.70E-07	1.7E-10	6.1E-09	7%	4.71%	N	0.00%
Nickel	2.0E-04	experimental	6.07E-07	1.2E-10	4.4E-09	4%	1.65%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	3.8E-10	1.4E-08	30%	1.10%	N	0.00%
Strontium	1.0E-03	default	1.02E-04	1.0E-07	3.7E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	1.7E-07	6.0E-06	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	9.7E-10	3.5E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	3.31E-05	3.3E-08	1.2E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	1.64E-05	1.6E-08	5.9E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	4.3E-10	1.6E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	1.3E-09	4.8E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.64E-04	1.6E-07	5.9E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	6.92E-05	6.9E-08	2.5E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	5.51E-07	5.5E-10	2.0E-08	6%	5.50%	N	0.00%
Nickel	2.0E-04	experimental	1.13E-06	2.3E-10	8.2E-09	4%	1.65%	N	0.00%
Strontium	1.0E-03	default	9.19E-05	9.2E-08	3.3E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Tennessee River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.52E-04	1.5E-07	5.5E-06	15%	2.20%	N	0.00%
Arsenic	1.0E-03	default	8.83E-07	8.8E-10	3.2E-08	95%	0.35%	N	0.00%
Barium	1.0E-03	default	3.35E-05	3.4E-08	1.2E-06	7%	4.71%	N	0.00%
Boron	1.0E-03	default	1.66E-05	1.7E-08	6.0E-07	0.7%	47.14%	Y	0.00%
Chromium	1.0E-03	experimental	3.80E-07	3.8E-10	1.4E-08	1.3%	25.38%	Y	0.00%
Copper	1.0E-03	default	9.72E-07	9.7E-10	3.5E-08	57%	0.58%	N	0.00%
Iron	1.0E-03	default	1.69E-04	1.7E-07	6.1E-06	6%	5.50%	N	0.00%
Manganese	1.0E-03	default	6.53E-05	6.5E-08	2.4E-06	6%	5.50%	N	0.00%
Molybdenum	1.0E-03	default	5.80E-07	5.8E-10	2.1E-08	6%	5.50%	N	0.00%
Nickel	2.0E-04	experimental	4.94E-07	9.9E-11	3.6E-09	4%	1.65%	N	0.00%
Selenium	1.0E-03	default	4.50E-07	4.5E-10	1.6E-08	30%	1.10%	N	0.00%
Strontium	1.0E-03	default	9.68E-05	9.7E-08	3.5E-06	100%	0.33%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Child Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	6.60E+03	cm2
t_event =	1.00E+00	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	6.00E+00	years
BW =	1.50E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	3.3E-09	1.2E-07	95%	0.35%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	4.9E-07	1.8E-05	7%	4.71%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	1.4E-07	5.2E-06	0.7%	47.14%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	1.1E-07	3.9E-06	6%	5.50%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	2.2E-07	1.2E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	1.0E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	4.15E-05	5.8E-08	3.3E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.21E-05	3.1E-08	1.8E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	6.4E-10	3.7E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	2.3E-09	1.3E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.17E-04	1.6E-07	9.4E-07	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.11E-05	4.4E-08	2.5E-07	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	8.92E-07	1.2E-09	7.2E-09	7%	14.68%	Y	0.00%
Mercury	1.0E-03	experimental	2.30E-07	3.2E-10	1.8E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	5.83E-07	1.6E-10	9.4E-10	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	1.1E-09	6.1E-09	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.7E-07	9.6E-07	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.62E-06	2.3E-09	1.3E-08	2.6%	39.51%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	1.8E-07	7.0E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	7.0E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.95E-05	5.5E-08	2.2E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.96E-05	2.7E-08	1.1E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	5.5E-10	2.2E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	2.5E-09	1.0E-07	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.19E-04	1.7E-07	6.7E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.42E-05	4.8E-08	1.9E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	9.27E-07	1.3E-09	5.2E-08	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	5.43E-07	1.5E-10	6.1E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	2.1E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.15E-04	1.6E-07	6.5E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.61E-06	2.3E-09	9.1E-08	2.6%	39.51%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	1.3E-07	7.4E-07	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	7.7E-10	4.4E-09	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.62E-05	5.1E-08	2.9E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.70E-05	2.4E-08	1.4E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	7.1E-10	4.1E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	1.4E-09	8.0E-09	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.26E-04	1.8E-07	1.0E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.51E-05	4.9E-08	2.8E-07	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	7.84E-07	1.1E-09	6.3E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	6.50E-07	1.8E-10	1.0E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	6.0E-10	3.5E-09	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.14E-04	1.6E-07	9.2E-07	30%	3.42%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	2.1E-07	1.2E-06	15%	6.85%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	5.9E-10	3.4E-09	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	2.4E-09	1.4E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	4.28E-05	6.0E-08	3.4E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.24E-05	3.1E-08	1.8E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	1.2E-09	6.7E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	2.4E-09	1.4E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.21E-04	1.7E-07	9.7E-07	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.16E-05	4.4E-08	2.5E-07	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	1.11E-06	1.6E-09	8.9E-09	7%	14.68%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	1.5E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	5.52E-07	1.5E-10	8.9E-10	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	6.8E-10	3.9E-09	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.7E-07	9.6E-07	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	2.08E-06	2.9E-09	1.7E-08	2.6%	39.51%	Y	0.00%
Zinc	6.0E-04	experimental	1.37E-05	1.2E-08	6.6E-08	highly variable			

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Emory River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.31E-04	3.2E-07	1.9E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	2.20E-06	3.1E-09	1.8E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	4.92E-05	6.9E-08	4.0E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.25E-05	3.2E-08	1.8E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	5.00E-07	7.0E-10	4.0E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.25E-06	1.8E-09	1.0E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.93E-04	2.7E-07	1.6E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	6.74E-05	9.4E-08	5.4E-07	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	1.01E-06	1.4E-09	8.1E-09	7%	14.68%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	1.5E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	6.29E-07	1.8E-10	1.0E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.05E-07	5.7E-10	3.3E-09	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.16E-04	1.6E-07	9.3E-07	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.69E-06	2.4E-09	1.4E-08	2.6%	39.51%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	3.1E-07	1.8E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	3.2E-09	1.8E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	5.37E-05	7.5E-08	4.3E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.16E-05	3.0E-08	1.7E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	6.6E-10	3.8E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	1.3E-09	7.2E-09	57%	1.80%	N	0.00%
Iron	1.0E-03	default	2.27E-04	3.2E-07	1.8E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	1.77E-04	2.5E-07	1.4E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	9.86E-07	1.4E-09	7.9E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	6.95E-07	1.9E-10	1.1E-09	4%	5.14%	N	0.00%
Strontium	1.0E-03	default	1.11E-04	1.6E-07	8.9E-07	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	1.2E-08	2.6%	39.51%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	1.2E-09	7.2E-09	95%	1.08%	N	0.00%
Barium	1.0E-03	default	5.05E-05	7.1E-08	4.1E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.89E-05	2.6E-08	1.5E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	5.7E-10	3.3E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	7.0E-10	4.0E-09	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.06E-04	1.5E-07	8.5E-07	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	1.28E-04	1.8E-07	1.0E-06	6%	17.12%	Y	0.00%
Mercury	1.0E-03	experimental	1.70E-07	2.4E-10	1.4E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	6.07E-07	1.7E-10	9.8E-10	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	3.1E-09	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.02E-04	1.4E-07	8.2E-07	30%	3.42%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	2.3E-07	9.4E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	1.4E-09	5.5E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.31E-05	4.6E-08	1.9E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.64E-05	2.3E-08	9.2E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	6.0E-10	2.4E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	1.9E-09	7.5E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.64E-04	2.3E-07	9.2E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	6.92E-05	9.7E-08	3.9E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	5.51E-07	7.7E-10	3.1E-08	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	1.13E-06	3.2E-10	1.3E-08	4%	5.14%	N	0.00%
Strontium	1.0E-03	default	9.19E-05	1.3E-07	5.2E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	8.6E-08	2.6%	39.51%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Tennessee River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.52E-04	2.1E-07	1.2E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	8.83E-07	1.2E-09	7.1E-09	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.35E-05	4.7E-08	2.7E-07	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.66E-05	2.3E-08	1.3E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	3.80E-07	5.3E-10	3.1E-09	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	9.72E-07	1.4E-09	7.8E-09	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.69E-04	2.4E-07	1.4E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	6.53E-05	9.1E-08	5.3E-07	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	experimental	5.80E-07	8.1E-10	4.7E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	4.94E-07	1.4E-10	7.9E-10	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.50E-07	6.3E-10	3.6E-09	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	9.68E-05	1.4E-07	7.8E-07	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.22E-06	1.7E-09	9.8E-09	2.6%	39.51%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	9.0E-08	7.6E-06	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	7.3E-10	6.1E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	4.15E-05	2.4E-08	2.0E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.21E-05	1.3E-08	1.1E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	2.7E-10	2.3E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	9.3E-10	7.9E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.17E-04	6.8E-08	5.7E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.11E-05	1.8E-08	1.5E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	8.92E-07	5.2E-10	4.4E-08	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	2.30E-07	1.3E-10	1.1E-08	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	5.83E-07	6.8E-11	5.7E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	4.4E-10	3.7E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	6.9E-08	5.8E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	1.62E-06	9.4E-10	7.9E-08	2.6%	20.08%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	7.3E-08	6.1E-06	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	7.3E-10	6.1E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.95E-05	2.3E-08	1.9E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.96E-05	1.1E-08	9.6E-07	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	2.3E-10	1.9E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	1.1E-09	8.9E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.19E-04	6.9E-08	5.8E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.42E-05	2.0E-08	1.7E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	9.27E-07	5.4E-10	4.5E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	5.43E-07	6.3E-11	5.3E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	2.2E-10	1.9E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.15E-04	6.7E-08	5.6E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	1.61E-06	9.3E-10	7.9E-08	2.6%	20.08%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	5.3E-08	4.5E-06	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	3.2E-10	2.7E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.62E-05	2.1E-08	1.8E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.70E-05	9.9E-09	8.3E-07	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	3.0E-10	2.5E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	5.8E-10	4.9E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.26E-04	7.3E-08	6.2E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.51E-05	2.0E-08	1.7E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	7.84E-07	4.5E-10	3.8E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	6.50E-07	7.5E-11	6.4E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	2.5E-10	2.1E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.14E-04	6.6E-08	5.6E-06	100%	0.52%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	2.2E-07	2.36E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	1.90E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	4.15E-05	5.8E-08	6.32E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.21E-05	3.1E-08	3.36E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	6.4E-10	7.00E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	2.3E-09	2.45E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.17E-04	1.6E-07	1.78E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.11E-05	4.4E-08	4.73E-07	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	8.92E-07	1.2E-09	1.36E-08	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	2.30E-07	3.2E-10	3.50E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	5.83E-07	1.6E-10	1.78E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	1.1E-09	1.16E-08	30%	4.20%	N	0.00%
Strontium	6.0E-04	experimental	1.19E-04	1.0E-07	1.09E-06	4%	18.90%	Y	0.00%
Vanadium	1.0E-03	default	1.62E-06	2.3E-09	2.47E-08	2.6%	48.46%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	1.8E-07	1.90E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	1.90E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.95E-05	5.5E-08	6.01E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.96E-05	2.7E-08	2.98E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	5.5E-10	5.93E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	2.5E-09	2.77E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.19E-04	1.7E-07	1.81E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.42E-05	4.8E-08	5.20E-07	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	9.27E-07	1.3E-09	1.41E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	5.43E-07	1.5E-10	1.65E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	5.78E-09	30%	4.20%	N	0.00%
Strontium	6.0E-04	experimental	1.15E-04	9.7E-08	1.05E-06	4%	18.90%	Y	0.00%
Vanadium	1.0E-03	default	1.61E-06	2.3E-09	2.45E-08	2.6%	48.46%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	1.3E-07	1.40E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	7.7E-10	8.34E-09	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.62E-05	5.1E-08	5.51E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.70E-05	2.4E-08	2.59E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	7.1E-10	7.76E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	1.4E-09	1.52E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.26E-04	1.8E-07	1.92E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.51E-05	4.9E-08	5.34E-07	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	7.84E-07	1.1E-09	1.19E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.50E-07	1.8E-10	1.98E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	6.0E-10	6.54E-09	30%	4.20%	N	0.00%
Strontium	6.0E-04	experimental	1.14E-04	9.6E-08	1.04E-06	4%	18.90%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	8.6E-08	7.3E-06	15%	3.48%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	2.4E-10	2.1E-08	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	9.9E-10	8.4E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	4.28E-05	2.5E-08	2.1E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.24E-05	1.3E-08	1.1E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	4.9E-10	4.1E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	9.7E-10	8.2E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.21E-04	7.0E-08	5.9E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.16E-05	1.8E-08	1.5E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	1.11E-06	6.4E-10	5.4E-08	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	1.90E-07	1.1E-10	9.3E-09	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	5.52E-07	6.4E-11	5.4E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	2.8E-10	2.4E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	6.9E-08	5.8E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	2.08E-06	1.2E-09	1.0E-07	2.6%	20.08%	Y	0.00%
Zinc	6.0E-04	experimental	1.37E-05	4.8E-09	4.0E-07	highly variable			

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	9.50E-05	5.5E-08	4.7E-06	6%	8.70%	N	0.00%
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.31E-04	1.3E-07	1.1E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	2.20E-06	1.3E-09	1.1E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	4.92E-05	2.9E-08	2.4E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.25E-05	1.3E-08	1.1E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	5.00E-07	2.9E-10	2.5E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.25E-06	7.3E-10	6.1E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.93E-04	1.1E-07	9.5E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	6.74E-05	3.9E-08	3.3E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	1.01E-06	5.9E-10	5.0E-08	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	1.90E-07	1.1E-10	9.3E-09	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	6.29E-07	7.3E-11	6.2E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.05E-07	2.3E-10	2.0E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.16E-04	6.7E-08	5.7E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	1.69E-06	9.8E-10	8.3E-08	2.6%	20.08%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc = 1.00E-03 mg/cm3 (default value for purpose of illustration)

SA= 1.80E+04 cm2
t_event = 5.80E-01 hr/event (35 minutes/event)
EV = 1.00E+00 event/day
EF = 3.50E+02 days/yr
ED = 2.40E+01 years
BW = 7.00E+01 kg
AT = 2.56E+04 days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	1.3E-07	1.1E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	1.3E-09	1.1E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	5.37E-05	3.1E-08	2.6E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.16E-05	1.3E-08	1.1E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	2.7E-10	2.3E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	5.2E-10	4.4E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	2.27E-04	1.3E-07	1.1E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	1.77E-04	1.0E-07	8.7E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	9.86E-07	5.7E-10	4.8E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	6.95E-07	8.1E-11	6.8E-09	4%	2.61%	N	0.00%
Strontium	1.0E-03	default	1.11E-04	6.4E-08	5.4E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	8.9E-10	7.5E-08	2.6%	20.08%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	5.2E-10	4.4E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	5.05E-05	2.9E-08	2.5E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.89E-05	1.1E-08	9.3E-07	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	2.4E-10	2.0E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	2.9E-10	2.5E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.06E-04	6.1E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	1.28E-04	7.4E-08	6.3E-06	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	1.70E-07	9.9E-11	8.3E-09	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	6.07E-07	7.0E-11	6.0E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	2.2E-10	1.9E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.02E-04	5.9E-08	5.0E-06	100%	0.52%	N	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	2.1E-07	2.27E-06	15%	8.40%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	5.9E-10	6.39E-09	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	2.4E-09	2.60E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	4.28E-05	6.0E-08	6.51E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.24E-05	3.1E-08	3.41E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	1.2E-09	1.28E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	2.4E-09	2.56E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.21E-04	1.7E-07	1.84E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.16E-05	4.4E-08	4.81E-07	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	1.11E-06	1.6E-09	1.69E-08	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	2.89E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	5.52E-07	1.5E-10	1.68E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	6.8E-10	7.35E-09	30%	4.20%	N	0.00%
Strontium	6.0E-04	experimental	1.19E-04	1.0E-07	1.09E-06	4%	18.90%	Y	0.00%
Vanadium	1.0E-03	default	2.08E-06	2.9E-09	3.17E-08	2.6%	48.46%	Y	0.00%
Zinc	6.0E-04	experimental	1.37E-05	1.2E-08	1.3E-07	highly variable			

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.31E-04	3.2E-07	3.52E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	2.20E-06	3.1E-09	3.35E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	4.92E-05	6.9E-08	7.49E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.25E-05	3.2E-08	3.42E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	5.00E-07	7.0E-10	7.61E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.25E-06	1.8E-09	1.90E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.93E-04	2.7E-07	2.94E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	6.74E-05	9.4E-08	1.03E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	1.01E-06	1.4E-09	1.54E-08	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	2.89E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.29E-07	1.8E-10	1.91E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.05E-07	5.7E-10	6.16E-09	30%	4.20%	N	0.00%
Strontium	6.0E-04	experimental	1.16E-04	9.7E-08	1.06E-06	4%	18.90%	Y	0.00%
Vanadium	1.0E-03	default	1.69E-06	2.4E-09	2.57E-08	2.6%	48.46%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	3.1E-07	3.32E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	3.2E-09	3.45E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	5.37E-05	7.5E-08	8.17E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.16E-05	3.0E-08	3.29E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	6.6E-10	7.15E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	1.3E-09	1.37E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	2.27E-04	3.2E-07	3.45E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	1.77E-04	2.5E-07	2.69E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	9.86E-07	1.4E-09	1.50E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.95E-07	1.9E-10	2.12E-09	4%	6.30%	N	0.00%
Strontium	6.0E-04	experimental	1.11E-04	9.3E-08	1.01E-06	4%	18.90%	Y	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	2.33E-08	2.6%	48.46%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	1.2E-09	1.36E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	5.05E-05	7.1E-08	7.68E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.89E-05	2.6E-08	2.88E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	5.7E-10	6.24E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	7.0E-10	7.63E-09	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.06E-04	1.5E-07	1.61E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	1.28E-04	1.8E-07	1.95E-06	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	1.70E-07	2.4E-10	2.59E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.07E-07	1.7E-10	1.85E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	5.78E-09	30%	4.20%	N	0.00%
Strontium	6.0E-04	experimental	1.02E-04	8.6E-08	9.31E-07	4%	18.90%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	9.7E-08	8.2E-06	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	5.6E-10	4.8E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.31E-05	1.9E-08	1.6E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.64E-05	9.5E-09	8.0E-07	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	2.5E-10	2.1E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	7.8E-10	6.6E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.64E-04	9.5E-08	8.0E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	6.92E-05	4.0E-08	3.4E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	5.51E-07	3.2E-10	2.7E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	1.13E-06	1.3E-10	1.1E-08	4%	2.61%	N	0.00%
Strontium	1.0E-03	default	9.19E-05	5.3E-08	4.5E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	8.9E-10	7.5E-08	2.6%	20.08%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Tennessee River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.52E-04	8.8E-08	7.5E-06	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	8.83E-07	5.1E-10	4.3E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.35E-05	1.9E-08	1.6E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.66E-05	9.6E-09	8.1E-07	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	3.80E-07	2.2E-10	1.9E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	9.72E-07	5.6E-10	4.8E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.69E-04	9.8E-08	8.3E-06	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	6.53E-05	3.8E-08	3.2E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	5.80E-07	3.4E-10	2.8E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	4.94E-07	5.7E-11	4.8E-09	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.50E-07	2.6E-10	2.2E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	9.68E-05	5.6E-08	4.7E-06	100%	0.52%	N	0.00%
Vanadium	1.0E-03	default	1.22E-06	7.1E-10	6.0E-08	2.6%	20.08%	Y	0.00%

Cancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 3 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	2.56E+04	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	1.6E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	2.4E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	7.1E-06	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	5.2E-06	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Cancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	18000	cm2
t_event =	1.4	hr/event
EV =	1	event/day
EF =	45	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	2.3E-07	2.54E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	1.4E-09	1.48E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.31E-05	4.6E-08	5.04E-07	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.64E-05	2.3E-08	2.50E-07	0.7%	180.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	6.0E-10	6.54E-09	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	1.9E-09	2.04E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.64E-04	2.3E-07	2.50E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	6.92E-05	9.7E-08	1.05E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	5.51E-07	7.7E-10	8.39E-09	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	1.13E-06	3.2E-10	3.44E-09	4%	6.30%	N	0.00%
Strontium	6.0E-04	experimental	9.19E-05	7.7E-08	8.39E-07	4%	18.90%	Y	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	2.33E-08	2.6%	48.46%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	2.2E-07	8.7E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	7.0E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	4.15E-05	5.8E-08	2.3E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.21E-05	3.1E-08	1.2E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	6.4E-10	2.6E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	2.3E-09	9.1E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.17E-04	1.6E-07	6.6E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.11E-05	4.4E-08	1.8E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	8.92E-07	1.2E-09	5.0E-08	6%	17.12%	Y	0.00%
Mercury	1.0E-03	experimental	2.30E-07	3.2E-10	1.3E-08	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	5.83E-07	1.6E-10	6.6E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	1.1E-09	4.3E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.7E-07	6.7E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.62E-06	2.3E-09	9.1E-08	2.6%	39.51%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	1.8E-07	7.0E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	7.0E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.95E-05	5.5E-08	2.2E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.96E-05	2.7E-08	1.1E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	5.5E-10	2.2E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	2.5E-09	1.0E-07	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.19E-04	1.7E-07	6.7E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.42E-05	4.8E-08	1.9E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	9.27E-07	1.3E-09	5.2E-08	6%	17.12%	Y	0.00%
Nickel	2.0E-04	experimental	5.43E-07	1.5E-10	6.1E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	2.1E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.15E-04	1.6E-07	6.5E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.61E-06	2.3E-09	9.1E-08	2.6%	39.51%	Y	0.00%

Nonancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	1.3E-07	5.2E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	7.7E-10	3.1E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.62E-05	5.1E-08	2.0E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.70E-05	2.4E-08	9.6E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	7.1E-10	2.9E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	1.4E-09	5.6E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.26E-04	1.8E-07	7.1E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.51E-05	4.9E-08	2.0E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	7.84E-07	1.1E-09	4.4E-08	6%	17.12%	Y	0.00%
Nickel	2.0E-04	experimental	6.50E-07	1.8E-10	7.3E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	6.0E-10	2.4E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.14E-04	1.6E-07	6.4E-06	30%	3.42%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	2.1E-07	8.4E-06	15%	6.85%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	5.9E-10	2.4E-08	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	2.4E-09	9.6E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	4.28E-05	6.0E-08	2.4E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.24E-05	3.1E-08	1.3E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	1.2E-09	4.7E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	2.4E-09	9.5E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.21E-04	1.7E-07	6.8E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	3.16E-05	4.4E-08	1.8E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	1.11E-06	1.6E-09	6.2E-08	6%	17.12%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	1.1E-08	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	5.52E-07	1.5E-10	6.2E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	6.8E-10	2.7E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.7E-07	6.7E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	2.08E-06	2.9E-09	1.2E-07	2.6%	39.51%	Y	0.00%
Zinc	6.0E-04	experimental	1.37E-05	1.2E-08	4.6E-07	highly variable			

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Emory River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.31E-04	3.2E-07	1.3E-05	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	2.20E-06	3.1E-09	1.2E-07	95%	1.08%	N	0.00%
Barium	1.0E-03	default	4.92E-05	6.9E-08	2.8E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.25E-05	3.2E-08	1.3E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	5.00E-07	7.0E-10	2.8E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.25E-06	1.8E-09	7.0E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.93E-04	2.7E-07	1.1E-05	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	6.74E-05	9.4E-08	3.8E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	1.01E-06	1.4E-09	5.7E-08	6%	17.12%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	1.1E-08	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	6.29E-07	1.8E-10	7.1E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.05E-07	5.7E-10	2.3E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.16E-04	1.6E-07	6.5E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.69E-06	2.4E-09	9.5E-08	2.6%	39.51%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	3.1E-07	1.2E-05	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	3.2E-09	1.3E-07	95%	1.08%	N	0.00%
Barium	1.0E-03	default	5.37E-05	7.5E-08	3.0E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	2.16E-05	3.0E-08	1.2E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	6.6E-10	2.6E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	1.3E-09	5.1E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	2.27E-04	3.2E-07	1.3E-05	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	1.77E-04	2.5E-07	1.0E-05	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	9.86E-07	1.4E-09	5.6E-08	6%	17.12%	Y	0.00%
Nickel	2.0E-04	experimental	6.95E-07	1.9E-10	7.8E-09	4%	5.14%	N	0.00%
Strontium	1.0E-03	default	1.11E-04	1.6E-07	6.2E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	8.6E-08	2.6%	39.51%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	1.2E-09	5.0E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	5.05E-05	7.1E-08	2.8E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.89E-05	2.6E-08	1.1E-06	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	5.7E-10	2.3E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	7.0E-10	2.8E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.06E-04	1.5E-07	6.0E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	1.28E-04	1.8E-07	7.2E-06	6%	17.12%	Y	0.00%
Mercury	1.0E-03	experimental	1.70E-07	2.4E-10	9.6E-09	7%	14.68%	Y	0.00%
Nickel	2.0E-04	experimental	6.07E-07	1.7E-10	6.8E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	2.1E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	1.02E-04	1.4E-07	5.7E-06	30%	3.42%	N	0.00%

Nonancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	2.3E-07	9.4E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	1.4E-09	5.5E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.31E-05	4.6E-08	1.9E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.64E-05	2.3E-08	9.2E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	6.0E-10	2.4E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	1.9E-09	7.5E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.64E-04	2.3E-07	9.2E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	6.92E-05	9.7E-08	3.9E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	5.51E-07	7.7E-10	3.1E-08	6%	17.12%	Y	0.00%
Nickel	2.0E-04	experimental	1.13E-06	3.2E-10	1.3E-08	4%	5.14%	N	0.00%
Strontium	1.0E-03	default	9.19E-05	1.3E-07	5.2E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	8.6E-08	2.6%	39.51%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adolescent Recreational Exposures to Inorganics in Tennessee River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.47E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	1.00E+01	years
BW =	4.50E+01	kg
AT =	3.65E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.52E-04	2.1E-07	8.6E-06	15%	6.85%	N	0.00%
Arsenic	1.0E-03	default	8.83E-07	1.2E-09	5.0E-08	95%	1.08%	N	0.00%
Barium	1.0E-03	default	3.35E-05	4.7E-08	1.9E-06	7%	14.68%	Y	0.00%
Boron	1.0E-03	default	1.66E-05	2.3E-08	9.3E-07	0.7%	146.75%	Y	0.00%
Chromium	1.0E-03	experimental	3.80E-07	5.3E-10	2.1E-08	1.3%	79.02%	Y	0.00%
Copper	1.0E-03	default	9.72E-07	1.4E-09	5.5E-08	57%	1.80%	N	0.00%
Iron	1.0E-03	default	1.69E-04	2.4E-07	9.5E-06	6%	17.12%	Y	0.00%
Manganese	1.0E-03	default	6.53E-05	9.1E-08	3.7E-06	6%	17.12%	Y	0.00%
Molybdenum	1.0E-03	default	5.80E-07	8.1E-10	3.3E-08	6%	17.12%	Y	0.00%
Nickel	2.0E-04	experimental	4.94E-07	1.4E-10	5.6E-09	4%	5.14%	N	0.00%
Selenium	1.0E-03	default	4.50E-07	6.3E-10	2.5E-08	30%	3.42%	N	0.00%
Strontium	1.0E-03	default	9.68E-05	1.4E-07	5.4E-06	30%	3.42%	N	0.00%
Vanadium	1.0E-03	default	1.22E-06	1.7E-09	6.9E-08	2.6%	39.51%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	9.0E-08	2.2E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	7.3E-10	1.8E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	4.15E-05	2.4E-08	5.9E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.21E-05	1.3E-08	3.2E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	2.7E-10	6.6E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	9.3E-10	2.3E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.17E-04	6.8E-08	1.7E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.11E-05	1.8E-08	4.4E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	8.92E-07	5.2E-10	1.3E-07	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	2.30E-07	1.3E-10	3.3E-08	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	5.83E-07	6.8E-11	1.7E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	4.4E-10	1.1E-07	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	6.9E-08	1.7E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	7.3E-08	1.8E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	7.3E-10	1.8E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.95E-05	2.3E-08	5.6E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.96E-05	1.1E-08	2.8E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	2.3E-10	5.6E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	1.1E-09	2.6E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.19E-04	6.9E-08	1.7E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.42E-05	2.0E-08	4.9E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	9.27E-07	5.4E-10	1.3E-07	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	5.43E-07	6.3E-11	1.6E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	2.2E-10	5.4E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.15E-04	6.7E-08	1.6E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	5.3E-08	1.3E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	3.2E-10	7.8E-08	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.62E-05	2.1E-08	5.2E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.70E-05	9.9E-09	2.4E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	3.0E-10	7.3E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	5.8E-10	1.4E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.26E-04	7.3E-08	1.8E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.51E-05	2.0E-08	5.0E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	7.84E-07	4.5E-10	1.1E-07	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	6.50E-07	7.5E-11	1.9E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	2.5E-10	6.1E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.14E-04	6.6E-08	1.6E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc = 1.00E-03 mg/cm3 (default value for purpose of illustration)

SA= 1.80E+04 cm2
t_event = 5.80E-01 hr/event (35 minutes/event)
EV = 1.00E+00 event/day
EF = 3.50E+02 days/yr
ED = 2.40E+01 years
BW = 7.00E+01 kg
AT = 8.76E+03 days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Clinch River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.55E-04	2.2E-07	6.9E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	5.5E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	4.15E-05	5.8E-08	1.8E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.21E-05	3.1E-08	9.8E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.60E-07	6.4E-10	2.0E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.61E-06	2.3E-09	7.1E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.17E-04	1.6E-07	5.2E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.11E-05	4.4E-08	1.4E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	8.92E-07	1.2E-09	4.0E-08	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	2.30E-07	3.2E-10	1.0E-08	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	5.83E-07	1.6E-10	5.2E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	7.60E-07	1.1E-09	3.4E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.7E-07	5.3E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	1.62E-06	2.3E-09	7.2E-08	2.6%	48.46%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Clinch River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.25E-04	1.8E-07	5.5E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	1.25E-06	1.8E-09	5.5E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.95E-05	5.5E-08	1.8E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.96E-05	2.7E-08	8.7E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	3.90E-07	5.5E-10	1.7E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.82E-06	2.5E-09	8.1E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.19E-04	1.7E-07	5.3E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.42E-05	4.8E-08	1.5E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	9.27E-07	1.3E-09	4.1E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	5.43E-07	1.5E-10	4.8E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	1.7E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	1.15E-04	1.6E-07	5.1E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	1.61E-06	2.3E-09	7.1E-08	2.6%	48.46%	Y	0.00%

Nonancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Clinch River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	9.18E-05	1.3E-07	4.1E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	5.48E-07	7.7E-10	2.4E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.62E-05	5.1E-08	1.6E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.70E-05	2.4E-08	7.5E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	5.10E-07	7.1E-10	2.3E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.00E-06	1.4E-09	4.4E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.26E-04	1.8E-07	5.6E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.51E-05	4.9E-08	1.6E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	7.84E-07	1.1E-09	3.5E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.50E-07	1.8E-10	5.8E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.30E-07	6.0E-10	1.9E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	1.14E-04	1.6E-07	5.1E-06	30%	4.20%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	8.6E-08	2.1E-05	15%	3.48%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	2.4E-10	6.0E-08	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	9.9E-10	2.4E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	4.28E-05	2.5E-08	6.1E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.24E-05	1.3E-08	3.2E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	4.9E-10	1.2E-07	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	9.7E-10	2.4E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.21E-04	7.0E-08	1.7E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	3.16E-05	1.8E-08	4.5E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	1.11E-06	6.4E-10	1.6E-07	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	1.90E-07	1.1E-10	2.7E-08	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	5.52E-07	6.4E-11	1.6E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	2.8E-10	6.9E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	6.9E-08	1.7E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	9.50E-05	5.5E-08	1.4E-05	6%	8.70%	N	0.00%
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.31E-04	1.3E-07	3.3E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	2.20E-06	1.3E-09	3.1E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	4.92E-05	2.9E-08	7.0E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.25E-05	1.3E-08	3.2E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	5.00E-07	2.9E-10	7.2E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.25E-06	7.3E-10	1.8E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.93E-04	1.1E-07	2.8E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	6.74E-05	3.9E-08	9.6E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	1.01E-06	5.9E-10	1.4E-07	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	1.90E-07	1.1E-10	2.7E-08	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	6.29E-07	7.3E-11	1.8E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.05E-07	2.3E-10	5.8E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.16E-04	6.7E-08	1.7E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	1.3E-07	3.1E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	1.3E-09	3.2E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	5.37E-05	3.1E-08	7.7E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	2.16E-05	1.3E-08	3.1E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	2.7E-10	6.7E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	5.2E-10	1.3E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	2.27E-04	1.3E-07	3.2E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	1.77E-04	1.0E-07	2.5E-05	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	9.86E-07	5.7E-10	1.4E-07	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	6.95E-07	8.1E-11	2.0E-08	4%	2.61%	N	0.00%
Strontium	1.0E-03	default	1.11E-04	6.4E-08	1.6E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	5.2E-10	1.3E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	5.05E-05	2.9E-08	7.2E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.89E-05	1.1E-08	2.7E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	2.4E-10	5.9E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	2.9E-10	7.2E-08	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.06E-04	6.1E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	1.28E-04	7.4E-08	1.8E-05	6%	8.70%	N	0.00%
Mercury	1.0E-03	experimental	1.70E-07	9.9E-11	2.4E-08	7%	7.46%	N	0.00%
Nickel	2.0E-04	experimental	6.07E-07	7.0E-11	1.7E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	2.2E-10	5.4E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	1.02E-04	5.9E-08	1.5E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reach A Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.49E-04	2.1E-07	6.6E-06	15%	8.40%	N	0.00%
Antimony	1.0E-03	default	4.20E-07	5.9E-10	1.9E-08	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	1.71E-06	2.4E-09	7.6E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	4.28E-05	6.0E-08	1.9E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.24E-05	3.1E-08	9.9E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	8.39E-07	1.2E-09	3.7E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.68E-06	2.4E-09	7.5E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.21E-04	1.7E-07	5.4E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	3.16E-05	4.4E-08	1.4E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	1.11E-06	1.6E-09	4.9E-08	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	8.4E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	5.52E-07	1.5E-10	4.9E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.83E-07	6.8E-10	2.1E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	1.19E-04	1.7E-07	5.3E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	2.08E-06	2.9E-09	9.2E-08	2.6%	48.46%	Y	0.00%
Zinc	6.0E-04	experimental	1.37E-05	1.2E-08	3.6E-07	highly variable			

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.31E-04	3.2E-07	1.0E-05	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	2.20E-06	3.1E-09	9.8E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	4.92E-05	6.9E-08	2.2E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.25E-05	3.2E-08	1.0E-06	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	5.00E-07	7.0E-10	2.2E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.25E-06	1.8E-09	5.5E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.93E-04	2.7E-07	8.6E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	6.74E-05	9.4E-08	3.0E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	1.01E-06	1.4E-09	4.5E-08	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	1.90E-07	2.7E-10	8.4E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.29E-07	1.8E-10	5.6E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.05E-07	5.7E-10	1.8E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	1.16E-04	1.6E-07	5.1E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	1.69E-06	2.4E-09	7.5E-08	2.6%	48.46%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reach C Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	2.18E-04	3.1E-07	9.7E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	2.27E-06	3.2E-09	1.0E-07	95%	1.33%	N	0.00%
Barium	1.0E-03	default	5.37E-05	7.5E-08	2.4E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	2.16E-05	3.0E-08	9.6E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.70E-07	6.6E-10	2.1E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	9.00E-07	1.3E-09	4.0E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	2.27E-04	3.2E-07	1.0E-05	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	1.77E-04	2.5E-07	7.9E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	9.86E-07	1.4E-09	4.4E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.95E-07	1.9E-10	6.2E-09	4%	6.30%	N	0.00%
Strontium	1.0E-03	default	1.11E-04	1.6E-07	4.9E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	6.8E-08	2.6%	48.46%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Emory River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic	1.0E-03	default	8.92E-07	1.2E-09	4.0E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	5.05E-05	7.1E-08	2.2E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.89E-05	2.6E-08	8.4E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.10E-07	5.7E-10	1.8E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	5.01E-07	7.0E-10	2.2E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.06E-04	1.5E-07	4.7E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	1.28E-04	1.8E-07	5.7E-06	6%	21.00%	Y	0.00%
Mercury	1.0E-03	experimental	1.70E-07	2.4E-10	7.5E-09	7%	18.00%	Y	0.00%
Nickel	2.0E-04	experimental	6.07E-07	1.7E-10	5.4E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	3.80E-07	5.3E-10	1.7E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	1.02E-04	1.4E-07	4.5E-06	30%	4.20%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	9.7E-08	2.4E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	5.6E-10	1.4E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.31E-05	1.9E-08	4.7E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.64E-05	9.5E-09	2.3E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	2.5E-10	6.1E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	7.8E-10	1.9E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.64E-04	9.5E-08	2.3E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	6.92E-05	4.0E-08	9.9E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	5.51E-07	3.2E-10	7.9E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	1.13E-06	1.3E-10	3.2E-08	4%	2.61%	N	0.00%
Strontium	1.0E-03	default	9.19E-05	5.3E-08	1.3E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Tennessee River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.52E-04	8.8E-08	2.2E-05	15%	3.48%	N	0.00%
Arsenic	1.0E-03	default	8.83E-07	5.1E-10	1.3E-07	95%	0.55%	N	0.00%
Barium	1.0E-03	default	3.35E-05	1.9E-08	4.8E-06	7%	7.46%	N	0.00%
Boron	1.0E-03	default	1.66E-05	9.6E-09	2.4E-06	0.7%	74.57%	Y	0.00%
Chromium	1.0E-03	experimental	3.80E-07	2.2E-10	5.4E-08	1.3%	40.15%	Y	0.00%
Copper	1.0E-03	default	9.72E-07	5.6E-10	1.4E-07	57%	0.92%	N	0.00%
Iron	1.0E-03	default	1.69E-04	9.8E-08	2.4E-05	6%	8.70%	N	0.00%
Manganese	1.0E-03	default	6.53E-05	3.8E-08	9.3E-06	6%	8.70%	N	0.00%
Molybdenum	1.0E-03	default	5.80E-07	3.4E-10	8.3E-08	6%	8.70%	N	0.00%
Nickel	2.0E-04	experimental	4.94E-07	5.7E-11	1.4E-08	4%	2.61%	N	0.00%
Selenium	1.0E-03	default	4.50E-07	2.6E-10	6.4E-08	30%	1.74%	N	0.00%
Strontium	1.0E-03	default	9.68E-05	5.6E-08	1.4E-05	100%	0.52%	N	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Residential Exposures to Inorganics in Acid Area 2 Groundwater.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Conc =	1.00E-03	mg/cm3 (default value for purpose of illustration)
SA=	1.80E+04	cm2
t_event =	5.80E-01	hr/event (35 minutes/event)
EV =	1.00E+00	event/day
EF =	3.50E+02	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2.00E+03 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/ Q = 1.14E+06 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Arsenic, total	1.0E-03	default	3.26E-06	1.9E-09	4.7E-07	95%	0.55%	N	0.00%
Barium, total	1.0E-03	default	4.85E-04	2.8E-07	6.9E-05	7%	7.46%	N	0.00%
Boron, total	1.0E-03	default	1.44E-04	8.4E-08	2.1E-05	0.7%	74.57%	Y	0.00%
Iron, total	1.0E-03	default	1.07E-04	6.2E-08	1.5E-05	6%	8.70%	N	0.00%
Manganese, total	1.0E-03	default	#N/A	#N/A	#N/A	6%	#N/A	#N/A	#N/A
Strontium, total	1.0E-03	default	#N/A	#N/A	#N/A	100%	#N/A	#N/A	#N/A

Nonancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Tennessee River Reach B Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.67E-04	2.3E-07	7.4E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	9.71E-07	1.4E-09	4.3E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.31E-05	4.6E-08	1.5E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.64E-05	2.3E-08	7.3E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	4.30E-07	6.0E-10	1.9E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	1.34E-06	1.9E-09	5.9E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.64E-04	2.3E-07	7.3E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	6.92E-05	9.7E-08	3.1E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	5.51E-07	7.7E-10	2.4E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	1.13E-06	3.2E-10	1.0E-08	4%	6.30%	N	0.00%
Strontium	1.0E-03	default	9.19E-05	1.3E-07	4.1E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	1.53E-06	2.1E-09	6.8E-08	2.6%	48.46%	Y	0.00%

Noncancer Dermal Absorbed Dose Calculations
for Adult Recreational Exposures to Inorganics in Tennessee River Reference Reach Surface Water.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

SA=	1.80E+04	cm2
t_event =	1.40E+00	hr/event
EV =	1.00E+00	event/day
EF =	4.50E+01	days/yr
ED =	2.40E+01	years
BW =	7.00E+01	kg
AT =	8.76E+03	days

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Aluminum	1.0E-03	default	1.52E-04	2.1E-07	6.7E-06	15%	8.40%	N	0.00%
Arsenic	1.0E-03	default	8.83E-07	1.2E-09	3.9E-08	95%	1.33%	N	0.00%
Barium	1.0E-03	default	3.35E-05	4.7E-08	1.5E-06	7%	18.00%	Y	0.00%
Boron	1.0E-03	default	1.66E-05	2.3E-08	7.4E-07	7%	18.00%	Y	0.00%
Chromium	1.0E-03	experimental	3.80E-07	5.3E-10	1.7E-08	1.3%	96.92%	Y	0.00%
Copper	1.0E-03	default	9.72E-07	1.4E-09	4.3E-08	57%	2.21%	N	0.00%
Iron	1.0E-03	default	1.69E-04	2.4E-07	7.5E-06	6%	21.00%	Y	0.00%
Manganese	1.0E-03	default	6.53E-05	9.1E-08	2.9E-06	6%	21.00%	Y	0.00%
Molybdenum	1.0E-03	default	5.80E-07	8.1E-10	2.6E-08	6%	21.00%	Y	0.00%
Nickel	2.0E-04	experimental	4.94E-07	1.4E-10	4.4E-09	4%	6.30%	N	0.00%
Selenium	1.0E-03	default	4.50E-07	6.3E-10	2.0E-08	30%	4.20%	N	0.00%
Strontium	1.0E-03	default	9.68E-05	1.4E-07	4.3E-06	30%	4.20%	N	0.00%
Vanadium	1.0E-03	default	1.22E-06	1.7E-09	5.4E-08	2.6%	48.46%	Y	0.00%