US EPA RECORDS CENTER REGION 5
1003509

June 26, 2006

From: Carolyn Bury, ECAS

To: Brian Freeman, Project Manager

Subject: Review of Draft BERA for DuPont East Chicago Site, April 2006

I reviewed the Draft Baseline Ecological Risk Assessment (Draft BERA) for the DuPont East Chicago Site, East Chicago, Indiana dated April 2006, submitted April 28, 2006.

Overall, the document is a well-prepared, transparent, conservative risk assessment that appropriately follows the Ecological Risk Assessment Guidance for Superfund (ERAGS), November 1997. The selected approaches and decisions reached are logical and supported. The document is very well written and easy to follow. The major concern is with the treatment of the investigation of potential adverse effects in the Natural Area, and with the Natural Area Buffer Zone. With respect to the Natural Area, the Draft BERA appears to be incomplete.

The Draft BERA evaluates current and future conditions of three areas on the site for potential adverse effects to ecological receptors - the Restricted Area, the Re-Development Area and the Natural Area Buffer Zone. Only the current conditions of the Re-Development Area were evaluated because the redevelopment plan would eliminate any habitat so future conditions are not relevant. The Natural Area and the Grand Calumet River Buffer Zone were not evaluated for ecological risk.

For the purposes of planning the next stages in the corrective action process, the Draft BERA makes these significant conclusions:

1) There is a potential for adverse ecological effects from inorganics in the Restricted Area (*i.e.,* deed restriction on development) which will be addressed in the CMS.

Comment: Based on some discussion in the Draft BERA, it appears likely that the CMS will propose addressing hot spots.

2) There is a potential for adverse ecological effects from inorganics in the Re-Development Area. The Draft BERA states that these will be addressed by developing the property which will remove the exposure pathways to receptors by eliminating habitat.

Comment: While redevelopment is not a remedial measure per se, it is being used as such to address potential adverse ecological effects. The CMS should therefore include a discussion of how ecological risk will be addressed through redevelopment, including a description of the redevelopment plan and a schedule. If redevelopment is

delayed beyond the construction of the other corrective measures, I would recommend that USEPA request that adverse ecological effects be addressed by intermediate remedial measures to remove the exposure pathways, such as the removal of contaminated soil and clean soil backfill.

3) Natural Area Buffer Zone - The draft BERA states that "No further evaluation or remedial action is necessary for the Natural Area Buffer Zone." This conclusion is based on an assumption that constituent migration via stormwater through this area is limited, concentrations decrease with distance from the source (operations area) and that "most remedial alternatives would result in natural resource damage that would be much greater than risk to ecological receptor populations."

Comment: The Draft BERA is incomplete for the following reasons.

The draft BERA concluded that there is a potential for adverse ecological effects in the Natural Area Buffer Zone ("NABZ," "buffer zone"). The NABZ was evaluated in part as a surrogate for the Natural Area to determine whether the Natural Area might be affected. However, even though the evaluation of the buffer zone showed a potential for ecological effects, potential adverse ecological effects in the Natural Area were not analyzed. It appears that the additional soil sampling in January 2006 which was designed to address data gaps did not follow the runoff migration pathways into the Natural Area even though COPC concentrations were elevated in the runoff transects.

Further, the Natural Area Buffer Zone boundaries are apparently not established, but will be formed from acreage subtracted from the Natural Area based on contaminated areas. As stated on page 2-2, "the width of the Buffer Zone [will be] based on the extent of contaminant migration." The Natural Area has several Federal and State threatened and endangered ("T&E") species. Because the NABZ has fluid boundaries, it is not clear that threatened and endangered species do not occur there; the evaluation of the NABZ does not include T&E species. It should be noted that only no-effects (NOAELs) concentrations are allowable where T&E species may be impacted.

Grand Calumet River Buffer Zone (Executive Summary) - Per the Grand Calumet River NRDA consent decree, DuPont is not responsible for the remediation of the riparian zone associated with the river. As requested by USEPA, the Draft BERA included an analysis of the constituent migration pathway through the riparian zone. Per the consent decree, DuPont is responsible for controlling discharges to the riparian zone and the river before NRD restoration is completed. If the discharges are not controlled before restoration is completed, then DuPont would be liable for restoring any habitat damaged by uncontrolled releases that occur after a formally designated date denoting completion of NRD restoration activities.

Miscellaneous - Aluminum, which is bioavailable at lower pHs (below 5.5), was generally eliminated from consideration at DuPont because the soil pHs are in the normal range (with the exception of EEA10). The soil pH data were not included in the

Draft BERA, so this was not verified.

General Comments

Natural Area - USEPA's previous comments on the SLERA stated that only discussing the potential of contaminant migration into the Natural Area while not evaluating potential adverse impacts within the area was unacceptable. The figure titled "Pre 2006 SWMU and AOC Sampling Locations - Overall Site Map shows sample locations in the Natural Area, but these are not discussed in the Draft BERA. The January 2006 soil sampling event was designed to close data gaps to support the analysis of potential ecological impacts. In that event, sampling in the buffer zone "runoff transects" measured elevated concentrations in the buffer zone, including the easternmost locations. Per the soil sampling work plan for the 2006 event, these sampling points were to represent concentrations in the Natural Area. An analysis of the Natural Area Buffer Zone concluded that potential adverse ecological effects exist for this area.

By extrapolation from the buffer zone to the Natural Area, unacceptable impacts to the Natural Area are possible and should be evaluated. Concentrations in the Natural Area are still unknown and therefore a data gap exists. Thus, the Draft BERA is incomplete and needs to be revised to include the Natural Area.

The Natural Area contains several Federal and State threatened and endangered species. It should be noted that for federally listed endangered species, only no-effects concentrations (*i.e., NOAELs*) are acceptable. The Draft BERA also states that any remedial activity in the Natural Area would do more harm than good. This may be true, however, USEPA has previously stated that such a foregone conclusion is not a valid reason to forgo characterizing the nature and extent of contamination in the area. Further, the USEPA is responsible for making such risk management decisions and needs to have sufficient information to make such a decision. As USEPA has consultation responsibilities under Section 7 of the Endangered Species Act (ESA), such a decision would be made with the USFWS and the IDNR.

Finally, the Draft BERA states that the Natural Area is under the jurisdiction of the NRDA consent decree. While the Natural Area may be under a conservation easement to the Indiana Department of Natural Resources per the consent decree, such an arrangement does not preclude DuPont from its RCRA Corrective Action responsibilities or responsibilities under the ESA. Therefore, the Draft BERA should be revised to include an analysis of the Natural Area. USEPA should assist in this effort and ensure that its consultation obligations under the ESA are met.

Specific Comments

2.1.3 Natural Area The Natural Area was not evaluated. A "Natural Area Buffer Zone" was designated and evaluated. The boundaries of the NABZ have not been

established as the text in this section states that the width of the zone will be based on the extent of contamination migration. There are two issues with this approach. First, as stated above, the potential adverse impacts to the Natural Area need to be evaluated. Second, a buffer zone is normally established to protect a sensitive area. The NABZ should have a distinctive boundary. It is unclear why the boundary is fluid, depending on the extent of contamination. Identifying Impacts to the Natural Area should not be avoided by changing its boundaries.

2.2.2 Grand Calumet River Riparian Buffer Zone The NRDA consent decree essentially states that DuPont has until the time that the river restoration is completed under the consent decree to control discharge of contamination to the river and adjacent riparian habitats. After the restoration, DuPont becomes responsible for any uncontrolled contamination to the river (e.g., via groundwater, contaminated soil runoff, etc.). The soils in the riparian zone may be contaminated in the smear zone; soils should be included in DuPont's work to control contamination to the river and riparian zone.

2.2.3 Re-Development Area Only the current conditions were evaluated in the Draft BERA as plans for the future are to redevelop this area and eliminate receptor exposure through the construction of buildings and pavement. The CMS should describe the redevelopment as it is proposed as the corrective measure to address ecological risk.

2.5 Ecosystems Potentially at Risk In this section, habitat types in the western portion of the Natural Area are described. Presumably, the western portion is the same as the NABZ. Within this area is an emergent marsh wetland. This is the only place where aquatic habitats in the zone are mentioned. More information is needed on the aquatic habitats, including whether they are contaminated. Surface water and sediment may need to be sampled. Also, it is not clear that the NABZ does not contain Federal or State T&E species and habitat.

The Natural area has several listed threatened and endangered species, and critical habitat, including insect, plant, reptile, avian and mammalian species. It is essential to determine whether contaminants have migrated to the critical habitats or have had a negative impact on the species. The Draft BERA does not assess the Natural Area.

2.9 Risk Questions It is assumed that question two has a typo, and that it should read " . . . cause adverse effects to soil invertebrate communities."

4.3.1 Characterizing Ecological Effects The document states that insufficient data points existed (fewer than 10) to calculate the 95% UCL and therefore the maximum and mean were used to determine exposure point concentrations. Based on the Summary of Risk Estimate Tables, some areas had sufficient samples (44) to perform this calculation. However, because the risk conclusions and recommendations would

not likely change based on a revised exposure point value, it is not necessary to revise the calculations.

5.2.3 Natural Area Buffer Zone Please refer to comments on this area, above.

It is not clear that Federal or State threatened and endangered species do not occur in the NABZ, particularly since the zone boundary is dependent on contaminant migration. Please note that for areas with Federal T&E species, only NOAEL concentrations of constituents are considered to be acceptable.

A discussion of soil sampling transect "RNOF05" is provided. This transect had higher than average concentrations of constituents. Although the topography is relatively flat, runoff areas into the Natural Area have been identified. Constituents tend to accumulate in low areas having organic matter and organic soils. Therefore, to determine the extent of contamination in this and all other runoff areas or swales directionally downgradient from the operations area toward the Natural Area, DuPont should take additional "step out" soil samples. Based on the habitat types identified in the Ecosystems Potentially at Risk section, above, surface water and sediment samples should also be taken.

Section Six, Conclusions USEPA agrees with the conclusions regarding the Re-Development Area and the Restricted Area. The conclusions regarding the Natural Area Buffer Zone and Natural need to be reconsidered for the reasons stated above.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
DE-9J

June 27, 2006

Mr. Thomas E. Stilley, P.E.
DuPont Corporate Remediation Group
Barley Mill Plaza
Building 19-2236
4417 Lancaster Pike
Wilmington, DE 19805

RE: DuPont E. Chicago
BERA Report
US EPA Response
IND 005 174 ~~2~~54
3

Dear Mr. Stilley:

The United States Environmental Protection Agency Region 5 (US EPA) has received and reviewed DuPont East Chicago's Baseline Ecological Risk Assessment (BERA) Report, dated April 2006, and is providing the comments provided by our ecological risk assessor. I e-mailed a copy of these to Alan Egler of URS Diamond last week, and discussed these comments with him in depth on the phone. They are given as an attachment to this letter. I am confident that DuPont's Corrective Measures Report will be able to address these comments with continued negotiation with the US EPA.

Please provide your responses as soon as possible, so we can all get going on the corrective measures. If I can be of any assistance or answer any questions, please don't hesitate to call me at 312-353-2720.

Sincerely,

Brian P. Freeman
Senior Chemist/Corrective Action Project Manager
RCRA Enforcement and Compliance Assurance Branch
Corrective Action Section

Attachment
cc: Mr. Alan Egler, URS Diamond, w/ attachment
Ms. Carolyn Bury, US EPA w/o attachment

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Carolyn Bury's Eco – Risk comments:

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DuPont Corporate Remediation Group
Barley Mill Plaza - Bldg. 19
4417 Lancaster Pike
Wilmington, DE 19805

April 28, 2006

Mr. Brian P. Freeman
U.S. EPA, Region V
Waste Pesticide and Toxics Division
Enforcement and Compliance Assurance Branch
77 West Jackson Boulevard, DRE-9J
Chicago, Illinois 60604-3590

Draft Baseline Ecological Risk Assessment Report

Dear Mr. Freeman:

Pursuant to RCRA Corrective Action Order IND 005 174 254, DuPont is enclosing three copies of a Draft Baseline Ecological Risk Assessment Report. After your review, we would be happy to meet with you and Carolyn Bury to discuss any comments you may have.

If you have any questions, please feel free to call Alan Egler at (302) 892-1296.

Sincerely,

Thomas E. Stilley
DuPont Corporate Remediation Group
Project Director

cc: Chris Meyers, IDEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF
DE-9J

December 15, 2005

Mr. Thomas E. Stilley, P.E.
DuPont Corporate Remediation Group
Barley Mill Plaza
Building 19-2236
4417 Lancaster Pike
Wilmington, DE 19805

RE: DuPont E. Chicago BERA
Sampling and Analysis Plan
IND 005 174 254

Dear Mr. Stilley:

The United States Environmental Protection Agency Region 5 (US EPA) has received and reviewed DuPont East Chicago's Baseline Ecological Risk Assessment (BERA) Sampling and Analysis plan.

This letter serves as approval of the plan, which I also discussed with Mr. Alan Egler on the phone, and e-mailed to him earlier today. Please move forward with the sampling as indicated.

If you have any questions or comments related to the this correspondence, please don't hesitate to convey them to me with a phone call to (312) 353-2720, or with an email to freeman.brian@epa.gov.

Sincerely,

Brian P. Freeman,
Senior Chemist &
Corrective Action Project Manager

cc: Alan Egler, URS Diamond
Chris Myer, IDEM

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DRAFT REPORT

BASELINE ECOLOGICAL RISK ASSESSMENT

DuPont East Chicago Site
East Chicago, Indiana

April 2006

Project No. 118984147.05002

URS

Corporate Remediation Group
An Alliance between
DuPont and URS Diamond
Barley Mill Plaza, Building 19
4417 Lancaster Pike
Wilmington, Delaware 19805

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Appendix E	Development of Toxicity Reference Values for Dose Rate Models
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This report presents the baseline ecological risk assessment (BERA) for DuPont's East Chicago Site (Site). It was conducted in accordance with the USEPA's *Ecological Risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting Ecological Risk Assessments* (USEPA 1997). The objective of the BERA is to describe the potential for adverse effects to ecological receptors that may result from exposure to Site-related contaminants under future and current conditions, as well as the nature and severity of effects. The BERA strategy was developed consistent with the future plans for the Site. Three separate areas of the site have been identified based on future land use. The former industrial area has been divided into a Restricted Area, which will not be redeveloped, and a Re-Development Area that will be used for industrial/commercial purposes. The third region is the Natural Area, which is being set aside as conservation land and will not be developed. The variation in the future use of each of these areas justifies implementation of a unique ecological risk assessment strategy to evaluate each of these areas independently.

The Restricted Area includes the northern half of the former industrial area (herein called the Restricted Area) and the Grand Calumet River Riparian Buffer Zone. The Restricted Area is naturally re-vegetating and will remain undeveloped, creating the potential for complete ecological exposure pathways and the need for a strategy to characterize current and future risks. The Grand Calumet River Riparian Buffer Zone is part of the NRD assessment for the Grand Calumet River. Under current conditions, the potential for adverse ecological effects is low due to limited area and the presence of dense *Phragmites* sp., which preclude use by most ecological receptors. The Riparian Buffer Zone will be restored as part of the NRD settlement activities.

The Re-Development Area has also been re-vegetating naturally. However, it is unlikely to become permanently re-vegetated since development activities will remove the vegetation and the area will be largely covered by impenetrable surfaces that will preclude the establishment of habitat and create barriers to ecological exposure. Therefore, exposure pathways in the Re-Development Area will be eliminated, resulting in negligible ecological risks. The BERA strategy for the Re-Development area focused on evaluating the potential for adverse ecological effects until the land is developed.

The Natural Area maintains the original natural community characteristics of the region, as it has never been developed, and is included in a Natural Resource Damage (NRD) settlement. This area supports a diverse community that includes several threatened and endangered species. This area was evaluated in the context of potential contaminant migration in surficial runoff from adjacent on-Site SWMUs and AOCs through the Natural Area Buffer Zone.

Twenty constituents of potential ecological concern (COPECs) were identified in the screening-level ecological risk assessment (SLERA) for the Site, including four organic and sixteen inorganic constituents. These COPECs were evaluated further in the BERA for potential effects on terrestrial plant and soil invertebrate communities, through direct exposure to contaminated soil, and wildlife populations, through the incidental ingestion of contaminated soil and ingestion of contaminated food/prey that may bioaccumulate COPECs.

Risks estimates for direct exposure of plants and invertebrates to COPECs in soil indicated a potential for adverse effects on the plant and soil invertebrate communities from most COPECs. A qualitative evaluation of the plant community in the Restricted and Re-Development Area indicated that there may be some impact on plants, as evidenced by limited small (<0.5 acre)

areas that are devoid of vegetation. Vegetation in the Natural Area Buffer Zone is dense and diverse, indicating that impacts to the plant community from COPECs in soil are negligible.

Results of the risk characterization for wildlife receptors determined that the potential for adverse effects in wildlife populations from fourteen COPECs is negligible. In summary, COPECs identified for each area at the Site include:

- Five metals in the Restricted Area (arsenic, cadmium, lead, selenium, and zinc),
- Six inorganic contaminants in the Re-Development Area (arsenic, cadmium, lead, selenium zinc and cyanide) and
- Four metals in the Natural Area Buffer Zone (cadmium, lead, selenium and zinc).

The potential for lateral transport of contaminants in stormwater runoff was evaluated for the Natural Area Buffer Zone. The evaluation indicated that there has been some lateral transport of metals into the Natural Area Buffer Zone from on-Site SWMUs and AOCs. However, transport has been limited because metals are typically tightly bound to soil particles and site topography and hydrogeology limits lateral flow. This was further supported by an observed general decrease in COPEC concentrations with increasing distance into the Natural Area Buffer Zone.

Based on future land use plans, risk estimates and an evaluation of contaminant fate and transport, conclusions from the BERA for each area on-Site are as follows:

Restricted Area. There is a potential for adverse ecological effects from five metal COPECs in the Restricted Area. These ecological risks will be addressed as part of the CMS for the East Chicago Site.

Re-Development Area. No further evaluation or remedial action is necessary for the Re-Development Area. There is a potential for adverse ecological effects from six inorganic COPECs in this area. However, development of this portion of the property will remove exposure pathways and eliminate risk to ecological receptors.

Natural Area Buffer Zone. No further evaluation or remedial action is necessary for the Natural Area Buffer Zone. Contaminant migration through the Natural Area Buffer Zone via stormwater runoff is limited. Because contaminant transport to the Natural Area Buffer Zone is limited, the potential for adverse ecological effects from Site-related contaminants is low. Most remedial alternatives would result in natural resource damage that would be much greater than risk to ecological receptor populations.

1.1 OBJECTIVE AND SCOPE

This report presents the baseline ecological risk assessment (BERA) for ecological receptors potentially exposed to contaminants from the historical operations at the DuPont East Chicago Site (Site). The Revised Phase II Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Report included the Screening-Level Ecological Risk Assessment (SLERA) for the Site (DuPont, 2005a). The ecological screening consisted of Steps 1 and 2 in the ERA process. The SLERA demonstrated the need to conduct a Baseline Ecological Risk Assessment (BERA) for some solid waste management units (SWMUs) and areas of concern (AOCs), as well as characterize other areas on-Site.

The objective of the BERA is to describe the likelihood, nature and severity of adverse effects to ecological receptors that may result from exposure to Site-related contaminants under future and current conditions. The BERA strategy was developed consistent with the future plans for the Site. Three separate areas of the Site have been identified based on future land use (Figure 1). Ecological exposure areas (EEAs) defined based on proximity of SWMUs and AOCs or differences in habitat have also been identified within these three areas. The three areas and their EEAs have been defined as follows:

Former Industrial Area			**Area 3 Natural Area**
Area 1 Restricted Area		**Area 2 Re-Development Area**	
Restricted Area SWMUs and AOCs	Grand Calumet River Riparian Buffer Zone	EEAs 1 - 13	

The Restricted Area and EEAs 1 – 13 include SWMUs and AOCs that were grouped based on proximity and similarities in historical Site operations.

The Restricted Area is naturally re-vegetating and will remain undeveloped, creating the potential for complete ecological exposure pathways and the need for a strategy to characterize current and future risks. While the Re-Development Area has also been re-vegetating naturally, it is unlikely to become permanently re-vegetated since development activities will remove the vegetation and the area will be largely covered by impenetrable surfaces that will preclude the establishment of habitat and create barriers to ecological exposure. Therefore, the potential for future ecological exposure and risks in this area is low, and the BERA strategy for the Re-Development area focuses on evaluating current risks until the land is developed. The Natural Area largely maintains the original natural community characteristic of the region, as it has never been developed and is under the jurisdiction of a Natural Resource Damage (NRD) settlement. This area was evaluated in the context of potential contaminant migration in surficial runoff from adjacent on-Site SWMUs and AOCs.

This BERA was conducted in accordance with the USEPA's *Ecological Risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting Ecological Risk Assessments* (USEPA 1997). However, because of differences in future land use plans for each of the three areas, a unique risk assessment strategy was used to evaluate ecological risks within each area separately. A field sampling plan (FSP) was executed in January 2006 to address data

gaps identified during the SLERA. The results obtained from this sampling event were used along with previously collected data for the BERA exposure estimates and risk calculations.

1.2 REPORT ORGANIZATION

The major sections of the BERA will be organized as follows:

Section 2.0 – Baseline Problem Formulation

This section includes a Site description, refinement of COPECs; description of ecosystems potentially at risk; selection of assessment endpoints; development of the conceptual site model; and development of risk questions.

Section 3.0 –Study Design and Data Quality Objective Process

This section establishes the measurement endpoints, receptors of concern (ROCs), study design and data quality objectives of the BERA. In this section, the conceptual site model is completed with the identification of measurement endpoints to evaluate the assessment endpoints established in Section 2.0.

Section 4.0 – Site Investigation

This section includes a description of the exposure and effects analysis for the BERA. During the analysis phase, an evaluation of ecological and chemical data is conducted to determine the potential for ecological exposure and adverse effects. The management goals and objectives, assessment endpoints, and measures of effect, as well as the ecological CSM developed during Problem Formulation help focus this analysis. The analysis consists of two components: (1) exposure analysis and (2) effects analysis. These two components are used to evaluate the relationships between receptors, potential exposures, and potential effects. The results of these evaluations provide the information necessary to estimate potential risks to the representative species.

Section 5.0 – Risk Characterization

The baseline risk estimate and risk description are presented in this section. Risk characterization is the final phase of the BERA, and involves three critical steps: 1) risk estimation, 2) uncertainty characterization, and 3) risk description. In the risk characterization, the information from the effects and exposure analyses is used to determine a probability of adverse effects to ROCs. The strengths, weaknesses and assumptions in the BERA are also discussed.

Section 6.0 – Scientific Management Decision Point (SMDP)

A scientific management decision point (SMDP) based on the results of the risk characterization, future land use plans and other Site information is presented in this section.

Section 7.0 - References

The problem formulation included:

- refinement of contaminants of potential ecological concern (COPECs);
- analysis of potential ecological effects;
- discussion of contaminant fate and transport;
- identification of ecosystems potentially at risk;
- identification of exposure pathways;
- selection of assessment endpoints;
- selection of measurement endpoints;
- development of a conceptual model;
- identification of risk questions; and
- a scientific/management decision point.

Because of project scheduling, additional site characterization for the BERA could only be performed during the winter when most vegetation is dormant; therefore, detailed plant community evaluations were not performed. Wildlife is also less active, either as a result of migratory or hibernation behavior. However, general qualitative ecological evaluations from previous site visits were sufficient to identify ecosystems and receptors potentially at risk.

The results of the screening level risk assessment, problem formulation and other site-specific information were used to determine the scope and goals of the BERA. Because historic and future land use is different for each of the three areas defined on Site, the risk management for each will be different. Difference in future land use lead to the development of a unique risk assessment strategy, and a separate BERA was performed for each of the three areas on-Site.

2.1 PROBLEM FORMULATION AND BASELINE ECOLOGICAL RISK ASSESSMENT STRATEGY

2.1.1 Restricted Area

The BERA for the Restricted Area focused on the northern half of the Site and the Grand Calumet River Riparian Buffer Zone along the southern edge of the Site. The northern half of the Site (herein called the Restricted Area) covers an area of approximately 145 acres and includes the former landfills, which have been covered with soil and currently support native vegetation that is in an early stage of succession. Based on similarity of vegetative cover, the SWMUs and AOCs in the Restricted Area were grouped to address exposure and risks in the BERA. The Restricted Area includes SWMU-1A, SWMU-1B, SWMU-1C, SWMU-1I, SWMU-1J and AOC-13. This approach provided a more holistic evaluation of the general habitat within and surrounding each SWMU and AOC that is more representative of ecological exposures. However, it is still possible to identify risk associated with specific smaller areas within the Restricted Area.

A qualitative evaluation of the Grand Calumet River Riparian Buffer Zone was performed to assess potentially complete exposure pathways. The Riparian Buffer Zone is part of the Natural

Resource Damage Assessment (NRDA) for the Grand Calumet River and will be altered significantly during remediation and restorations activities.

2.1.2 Re-Development Area

The BERA for the Re-Development Area focused on the central and southwestern portion of the Site, which includes the former chemical manufacturing facilities. It currently supports native vegetation that is in an early stage of succession, including grasses and herbaceous plants. As with the Restricted Area, EEAs have also been developed for the Re-Development Area. SWMUs and AOCs were grouped into EEAs 1 through 13, as follows:

EEA1	SWMU-2D (pit and mound area)
EEA2	SWMU-3 and AOC-2B
EEA3	SWMU-4 and AOC-2E
EEA4	SWMU-7
EEA5	SWMU-10A, SWMU-10D and AOC-12
EEA6	SWMU-10B and SWMU-10C
EEA7	SWUM-2C
EEA8	SWMU-8, AOC-2A, AOC-2C and AOC-3E
EEA9	SWMU-14
EEA10	SWMU-21, AOC-1C, AOC-3H and AOC-5
EEA11	AOC-2D
EEA12	AOC-1F, AOC-3A1 and AOC-3A2
EEA13	AOC-6

Additional evaluation was also performed for SWMU-17B.

2.1.3 Natural Area

The BERA for the Natural Area focused on an undeveloped area on the eastern half of the DuPont property that is managed by the Nature Conservancy. This area covers approximately 172 acres and is characterized by the original plains/dunes geomorphology of the region, native vegetation, and high quality wildlife habitats. There is concern that Site-related contaminants have been carried into the Natural Area by stormwater runoff, as the topography slopes gently from the former industrial area toward the Natural Area.

The Natural Area is separated from the former industrial area by a natural buffer zone. The Natural Area Buffer Zone supports a transitional vegetation community. Soil sampling and analysis were performed in the Natural Area Buffer Zone to evaluate the potential for COPECs to migrate toward the Natural Area via stormwater runoff and help define the width of the Buffer Zone based on the extent of contaminant migration.

2.2 REFINEMENT OF COPECS

In the SLERA, the maximum concentration of each constituent for each SWMU and AOC was compared with an ecological screening level (ESL) that represents a no observable adverse effects level (NOAEL) using the hazard quotient (HQ) method (USEPA 1997). This provided a preliminary characterization of risk and identified COPECs for each SWMU and AOC. For the purposes of the BERA, soil data collected in 1999, 2003 and 2006 were pooled for each EEA and area and compared with updated screening levels to identify COPECs. The following sources of soil screening benchmarks were used to identify COPECs (in order of priority):

- Eco-SSLs (USEPA 2005);
- USEPA Region 5 ESLs (USEPA 2003);
- Oak Ridge National Laboratory Ecotoxicological Screening Benchmarks for plants and earthworms (ORNL, 1997a and 1997b);
- USEPA Region 6 ESLs (USEPA 1999); and
- USEPA Region 4 ESLs (Westinghouse Savannah River Company 1998; USEPA 2001).

Only constituents identified as COPECs for each area were evaluated in the BERA.

2.2.1 Restricted Area

Results of the screen to refine the COPECs are presented in Table A-1 of Appendix A. Constituents were identified as COPECs based on the following three criteria:

1) Maximum concentrations of COPECs exceeded soil screening benchmarks.
2) One-half the method detection limit (MDL) exceeded soil screening benchmarks.
3) No screening benchmark was identified.

Twelve metals and nine pesticides and polychlorinated biphenyls (PCBs) were identified as COPECs. Metals are the primary COPECs in the Restricted Area. Maximum concentrations of metal COPECs were not associated with any one SWMU or AOC, but instead were detected throughout the Restricted Area. Aroclors-1254 and -1260 were identified as COPECs in SWMU-1C, and DDT and methoxychlor were identified as COPECs in SWMU-1J. Aroclors 1016, 1221, 1232, 1242 and 1248 were also identified as COPECs because one-half the method detection limit (MDL) exceeded soil screening benchmarks.

Several constituents were eliminated from further ecological evaluation in the BERA. Constituents that did not exceed soil screening benchmarks were eliminated from further risk assessment because risk from these constituents is negligible. The Aroclors for which one-half the MDL exceed screening benchmarks were eliminated from further evaluation, as well, because two Aroclors were retained for further evaluation, and any risk management for those Aroclors will address risks from the other Aroclors. Iron was also eliminated from further evaluation because it is an essential element and did not exceed background concentrations.

COPECs evaluated in the BERA for Restricted Area included:

antimony	copper	Aroclor 1254

arsenic	lead	Aroclor 1260
barium	nickel	DDT
boron	selenium	methoxychlor
cadmium	vanadium	
chromium	zinc	

2.2.2 Grand Calumet River Riparian Buffer Zone

Soil sampling and analysis has not been performed for the Grand Calumet River Riparian Buffer Zone. The only SWMU in the Buffer Zone is SWMU-15, a former wastewater treatment outfall. The outfall once discharged to the Grand Calumet River, and part of the system was regulated under the National Pollutant Discharge Elimination System (NPDES) program. DuPont is addressing potential sources of groundwater contamination associated with other SWMUs and AOCs and groundwater migration of contamination to the Riparian Buffer Zone in a Corrective Measures Study (CMS). Groundwater migration of contaminants south toward the Grand Calumet River, where groundwater may discharge in the form of seeps, was included as part of the BERA ecological conceptual site model (ECSM) to identify the potential for ecological impact in the Riparian Buffer Zone. However, as stipulated in the NRDA settlement, DuPont is required "to address releases of existing contamination from such facility to the GCR/IHC Riparian Site that occurs after the date that the Trustees, in writing, have determined that restoration activities have been completed..." (page 25 of the "GCR/IHC Consent Decree"). Based on the Consent Degree, the transport pathway to the riparian zone will generally be addressed elsewhere.

2.2.3 Re-Development Area

Metals represent the primary COPECs in the Re-Development Area. DDT was also identified as a COPEC in SWMUs 4 and 7 and AOC-2E. Methoxychlor was identified as a COPEC in SWMUs 4 and 7. Results of the screen to refine the COPECs are presented in Tables A-2 through A-13 of Appendix A.

The historical Site operations and COPECs identified for each EEA are as follows:

EEA	SWMUs and AOCs	Size (acres)	Historical Operations	COPECs
1	SWMU-2D (pit and mound area)	2.5	disposal site for fly ash from coal-fired boiler operations	antimony, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, thallium, vanadium, zinc
2	SWMU-3 and AOC-2B	3.2	disposal area near chrome outfall; railroad loading and unloading area for bulk chemicals, including tank sludges and acids	antimony, arsenic, barium, boron, cadmium, chromium, copper, lead, nickel, selenium, vanadium, zinc
3	SWMU-4 and	3.1	insecticide manufacturing and	antimony, arsenic, barium,

	AOC-2E		disposal area; railroad loading and unloading area for agricultural chemicals	cadmium, chromium, copper, lead, nickel, selenium, vanadium, zinc, cyanide, DDT, methoxychlor,
4	SWMU-7	0.9	chemical storage building for agricultural chemicals (only foundation remaining)	antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium vanadium, zinc, cyanide, DDT, methoxychlor
5	SWMU-10A, SWMU-10D and AOC-12	1.7	storage area for Freon®	antimony, arsenic, barium, cadmium, copper, chromium, lead, manganese, nickel, mercury, selenium, thallium, vanadium, zinc
6	SWMU-10B and SWMU-10C	0.5	acid neutralization pit (backfilled)	antimony, arsenic, cadmium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, zinc
7	SWUM-2C	0.6	coal storage and fly ash disposal	antimony, cadmium, copper, lead, nickel, selenium, vanadium, zinc
8	SWMU-8, AOC-1G, AOC-2A, AOC-2C and AOC-3E	6.7	railroad loading and unloading and storage area for acids and sulfites (6.0 acres); disposal area for wastes generated from the burning of zinc sulfur (0.7 acres)	antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, zinc
9	SWMU-14	2.2	chromium outfall	antimony, arsenic, cadmium, zinc
10	SWMU-21, AOC-1C, AOC-3H and AOC-5	5.3	vehicle loading and unloading and sulfuric acid and sulfate storage	antimony, arsenic, barium, cadmium, copper, lead, nickel, selenium, vanadium, zinc
11	ACO-2D	0.3	railroad loading and unloading area	none
12	SWMU-12B, AOC-1F, AOC-3A1 and AOC-3A2	2.1	vehicle loading and unloading; acid storage and disposal area for antimony pentachloride	antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, zinc
13	AOC-3I and AOC-6	4.3	zinc milling operations	antimony, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, zinc

In some cases, aluminum and iron concentrations exceeded screening benchmarks. However, aluminum is not highly bioavailable, and therefore not toxic, above soil pH of 5.5. Soil pH throughout most the Site was near neutral, therefore ecological risk from aluminum was considered to be negligible. Iron was also eliminated from further evaluation because it is an

essential element, its bioavailability is generally low and concentrations did not exceed background concentrations.

Additional discussion for EEA9, EEA10 and EEA11 is provided below to supplement results from refinement of the COPECs.

EEA9: Re-Development Area EEA9 is the site of former chromium outfall. However, chromium was eliminated from further evaluation because maximum detected concentrations only exceeded the screening benchmark marginally and at two sample locations. Therefore, it was concluded that risk from chromium is negligible.

EEA10: Metals availability in this EEA is expected to be high, as soil acidity in AOC-1C is 5.2-5.6 and AOC-5 is 3.7-4.3. Sulfate concentrations were also evaluated because of the nature of historical operations. Soil concentrations of sulfate were determined to be high (867 mg/kg in surface soil and 4,250 mg/kg in sub-surface soil) relative to the normal range expected to support healthy vegetation growth (8.0-17 mg/kg).

EEA11: Re-Development EEA11 includes AOC-2D and is approximately 0.3 acres in size. This was formerly a railroad loading and unloading area. Constituents of concern included acids and sulfites. Soil pH in this area was determined to be near neutral (8.6 su). Sulfate concentrations (26.9 mg/kg) were slightly greater than normal ranges to support healthy vegetation growth (8.0-17 mg/kg).

SWMU-17B: SWMU-17B is an abandoned process sewer system that includes French drains, abandoned sewer lines, and process sewers. Sediment sampling had been proposed for the Phase I RFI (DuPont 2002) to evaluate risk from potential sediment releases to the Grand Calumet River. However, all manhole covers to the sewer system had collapsed and no sediment was present. Therefore, no data were collected for SWMU-17B.

Because the integrity of the sewer system has been compromised, there is a potential that contaminants associated with the former process sewer have leached to sub-surface soil. However, ecological exposure pathways in the vicinity of the sewer system are expected to be incomplete because of the depth of contamination. Potentially complete exposure pathways may result from groundwater migration of contaminants from SWMU-17B, but the potential for groundwater migration of contaminants is expected to be low (DuPont 2002).

2.2.4 Natural Area Buffer Zone

It has been demonstrated that Site-related metals are present in soils collected from the Buffer Zone between the developed and Natural Area (DuPont, 2004). Additional data were collected for the BERA and pooled with existing data. The same approach for refining COPECs described for the Restricted Area (Section 2.1.1) was used for the Natural Area.

Screening results for the Natural Area Buffer Zone are presented in Table A-14 of Appendix A. Sixteen metals were identified as COPECs because they exceeded soil screening benchmarks. However, aluminum was eliminated from further evaluation because it is not highly bioavailable, and therefore not toxic, above soil pH of 5.5. Soil pH throughout the Site was greater than 6.0, therefore ecological risk from aluminum was considered to be negligible. Iron was also eliminated from further evaluation because it is an essential element and did not exceed background concentrations.

COPECs evaluated for the Natural Area Buffer Zone in the BERA included:

antimony	cobalt	selenium
arsenic	copper	silver
barium	lead	thallium
cadmium	manganese	vanadium
chromium	mercury	zinc
	nickel	

2.3 KNOWN ECOLOGICAL EFFECTS

The refinement of the COPECs identified the potential for ecological effects from metals, pesticides and PCBs in the Restricted Area. Soluble phase metal ions may pose the greatest threat to ecological receptors in aerobic media. These bioavailable ions may include the divalent ions cadmium, copper, lead, nickel, silver and zinc. Metals may have individual or additive effects to a receptor, and can interrupt a broad array of normal metabolic processes by their effects on metal-coenzyme moderated processes, the central nervous system and renal functions.

Metal concentrations associated with the Stoker Grate Ash Landfill (SMWU-1A) in the Restricted Area and other Site operations in the Re-Development Area may be limiting plant growth in specific isolated areas that are devoid of vegetation. Soil invertebrates, which may be sensitive to metals, might also be affected. In turn, these effects may preclude use of these areas by wildlife. Several metals and PCBs in this area may also impact wildlife via bioaccumulation in food chain pathways. No visible effects on the plant and animal communities in the Natural Area have been identified. The potential ecological effects of metals and pesticides/PCBs are described in Appendix B.

2.4 CONTAMINANT FATE AND TRANSPORT

The majority of COPECs identified for the East Chicago Site are persistent in soils. Metals are not biodegradable, and very little biodegradation of pesticides and PCBs will occur. Under aerobic conditions, metals may be present and bioavailable as soluble phase ions. Under anaerobic conditions, most of the divalent metals tend to be complexed as insoluble sulfides and their capacity for toxic expression is substantially diminished. Metals also tend to bind with organic carbon and take up cation exchange sites. Acidic conditions, such as those observed for EEA10, may increase the solubility of metals. However, the pH of Site soils is generally near neutral; therefore, solubility of metals in soil is likely to be low.

COPECs can be transported to adjacent areas by storm water runoff and into shallow groundwater by percolation. However, the topography of the Site is nearly level and soil is fairly porous. Therefore, very little lateral transport is expected to occur. Limited stormwater runoff occurs toward the eastern portion of the Site. Infiltration dominates surface water transport processes, and the primary contaminant migration pathway is through groundwater transport. Generally, groundwater flow is north and south from an east-west dividing line along the center

of the Site. Flow is toward the north through Restricted Area and south toward the Grand Calumet River through the Re-Development Area into the Riparian Buffer Zone. There is a very small groundwater gradient toward the east in the northeastern portion of Restricted Area. Because of the dense vegetation that occurs throughout most of the Site, wind transport of eroded surface soil is expected to be minimal.

2.5 ECOSYSTEMS POTENTIALLY AT RISK

The following paragraphs summarize receptors and habitats that may be at risk:

Restricted Area

Vegetation cover types in Restricted Area include:

- Early succession stage upland forest and shrub/scrub,
- 'Old field' herbaceous vegetation and grasslands and
- A small (less than one acre) wetland area with *Phragmites* sp.

The Restricted Area is predominantly covered by dense vegetation. However, there are also small (less than one acre) barren areas of fill material. The primary potential receptors include plants, invertebrates, birds, small mammals and deer. White-tailed deer were observed during a Site visit, as were several species of songbirds.

Grand Calumet River Riparian Buffer Zone

Vegetation cover types in Grand Calumet River Riparian Buffer Zone include:

- Riparian buffer shrub/scrub and
- Dense stands of *Phragmites* sp.

The Grand Calumet River Riparian Buffer Zone is very narrow and occupies a steep bank. The bank is heavily vegetated with shrub/scrub and dense thickets of *Phragmites* sp. marsh grass (Figure 2). These conditions preclude regular use by wildlife, limiting exposure in the Riparian Buffer Zone.

Re-Development Area

Vegetation cover types in the Re-Development Area include:

- Early succession stage grasslands;
- Islands of upland forest and shrub/scrub, and;
- Equisetum/*Phragmites* emergent wetlands.

As with the Restricted Area, the Re-Development Area is predominantly covered by dense vegetation. However, there are also small barren areas of fill material. The primary potential receptors include plants, soil invertebrates, birds, small mammals and deer. White-tailed deer were observed during a Site visit, as were several species of songbirds.

Natural Area

Vegetation along the western boundary of the Natural Area includes:

- Early succession stage upland forest and shrub/scrub,
- Emergent marsh wetland, and
- Old field herbaceous vegetation and grasslands.

The landscape within the Natural Area contains a mosaic of:

- Wet and dry sand prairie,
- Sand savanna,
- Sedge meadow,
- Marsh,
- Swamp,
- Shrub/scrub and
- Pond communities.

Over 250 native plant species have been identified in the Natural Area. The prairie habitats generally contain broad leaved herbs intermixed with grasses and sedges. Savannas provide similar habitat, but also contain red and black oak, with densities of 15-30 stems/acre and up to 50% canopy cover. Palustrine wetlands found in the Natural Area include emergent marsh, forested wetland, and ponds with aquatic vegetation and open water. Characterization and a description of the potentially exposed habitats and wildlife are provided in this BERA Report.

Several listed threatened and endangered species have been identified in this area, including the federally listed Karner blue butterfly (*Lycaeides melissa* samuelis) and state listed Hill's thistle (*Cirsium hillii*), several orchids, bush-honeysuckle (*Diervilla lonicera*) and yellow ladies' slippers (*Cypripedium calceolus*). Resident fauna include dusted skipper, Blanding's turtle, spotted turtle, slender glass lizard, and Franklin's ground squirrel. The Natural Area also provides critical nesting and migratory habitat for American bittern, yellow-billed cuckoo, red-headed woodpecker, and eastern meadowlark.

2.6 COMPLETE EXPOSURE PATHWAYS

The BERA for DuPont East Chicago Site focused on exposure of plants and soil invertebrates, by direct contact with contaminated soil, and wildlife, by ingestion of contaminated soil and food/prey. The topography of the Site is relatively level and soils are porous. Contaminants in the Restricted Area have the potential to infiltrate to the groundwater and migrate northward, away from the Grand Calumet River. Contaminants in the Re-Development Area have the potential to infiltrate to the groundwater and migrate south to the Grand Calumet River and the Riparian Buffer Zone. Any contaminant migration to the Grand Calumet River may result in exposure of aquatic receptors to COPECs that originated from Site operations in the Re-Development Area. If shallow groundwater discharges to surface soils in low-lying areas, terrestrial receptors could be exposed to COPECs in surface soils at the discharge points. There is a small eastward groundwater gradient in the northeastern portion of the Restricted Area. If shallow groundwater discharges to surface soils in low-lying areas, terrestrial receptors could be exposed to COPECs in surface soils at the discharge points. Although contaminant migration via stormwater runoff is limited, there may be some eastward contaminant migration from the

former industrial area. Contaminant migration via stormwater runoff could result in contamination of surface soil and exposure of ecological receptors in the Natural Area Buffer Zone. These exposure pathways are illustrated in the ECSM in Figure 3, and are addressed in this BERA.

2.7 SELECTION OF ASSESSMENT ENDPOINTS

The selection of assessment endpoints is based on three principal criteria: (1) ecological relevance, (2) susceptibility to potential stressors, and (3) representation of management goals. Aassessment endpoints identified for ecological receptors at the Site include:

- Viability and function of terrestrial plant communities,
- Viability and function of soil invertebrate communities,
- Viability and function of avian populations and
- Viability and function mammalian populations.

No assessment endpoints have been selected for the Grand Calumet River Riparian Buffer Zone because ecological exposures are expected to be insignificant based on limited extent and accessibility of ecological habitat.

The purpose of the assessment endpoints is to provide protection of ecological resources including valued habitats, wildlife, and special status species (i.e. state or federally listed threatened or endangered species). To implement this process, a field reconnaissance was performed to identify ecological receptors and functional groups on-Site. Several functional groups were identified, including autotrophs, detritovores, herbivores, invertivores, omnivores and carnivores.

Requests for Indiana Department of Natural Resources (IDNR) and U.S. Fish and Wildlife Service (USFWS) database searches were submitted on December 2, 2004 to identify the potential presence of listed rare, threatened, and endangered species on and in the vicinity of the Site. A response letter dated December 6, 2004 was received from IDNR. Results of their database search returned 39 species and 12 natural communities that are federally or state listed as endangered, threatened, or rare within one mile of the DuPont Site. A response letter from USFWS, dated December 20, 2004, states that the project Site lies within the range of four federally listed species: Indiana bat (*Myotis sodalis*), Karner blue butterfly (*Lycaeides melissa* samuelis), bald eagle (*Haliaeetus leucocephalus*), and dune thistle (*Cirsium pitcheri*). Copies of the information request letters and their responses are included (Appendix C).

2.8 CONCEPTUAL MODEL

All potentially complete, incomplete, and insignificant pathways were identified and considered as part of this BERA. Figure 3 is the ECSM illustrating potentially complete exposure pathways. Complete ecological exposure pathways require the presence of all of the following components:

- Source of contamination (e.g., former Site operations);
- Transport mechanism (e.g., deposition or storm water runoff);

- Contact points for ecological receptors (e.g., soil);
- Uptake mechanism (e.g., direct contact or food/prey ingestion); and
- Receptor biota (e.g., wildlife, plants, soil invertebrates).

Pathway analysis was performed for each area on-Site and the results were used to refine the general terrestrial ECSM.

Former operations on-Site have lead to the deposition of constituents in soil. Terrestrial receptors may be exposed to soil constituents through four primary exposure routes, including direct contact, ingestion of contaminated food/prey, incidental ingestion of soil during feeding or dusting, and inhalation. Direct contact was only considered to be a significant exposure pathway for plants and soil invertebrates. Exposure from dermal absorption of contaminants in wildlife receptors was considered to be insignificant. Also, because soil is generally stabilized by Site vegetation, exposure via the inhalation route was considered to be negligible.

Constituents in soil may leach to the shallow groundwater through stormwater infiltration. Groundwater migration can then transport constituents to other areas. Constituents may also migrate to other areas via stormwater runoff. However, the topography of the Site is relatively level, soils are porous, and lateral transport of constituents in stormwater runoff is expected to be limited.

Off-Site sources, including atmospheric deposition from up-wind fossil-electric generating stations and metals manufacturing operations, may be contributing to contamination on-Site. The potential for contamination from off-Site sources was identified in the ECSM and evaluated by collecting background samples from an appropriate reference area.

2.9 RISK QUESTIONS

Risk questions addressed in the BERA include:

1.	Do concentrations of contaminants have the potential to cause adverse effects in the terrestrial plant communities?
2.	Do concentrations of contaminants have the potential to cause adverse effects in the terrestrial plant communities?
3.	Do concentrations of contaminants have the potential to cause adverse effects in herbivorous bird populations?
4.	Do concentrations of contaminants have the potential to cause adverse effects in invertivorous bird populations?
5.	Do concentrations of contaminants have the potential to cause adverse effects in omnivorous bird populations?
6.	Do concentrations of contaminants have the potential to cause adverse effects in carnivorous bird populations?
7.	Do concentrations of contaminants have the potential to cause adverse effects in herbivorous mammal populations?
8.	Do concentrations of contaminants have the potential to cause adverse effects in

	invertivorous mammal populations?
9.	Do concentrations of contaminants have the potential to cause adverse effects in omnivorous mammal populations?
10.	Do concentrations of contaminants have the potential to cause adverse effects in carnivorous mammal populations?

The lines of evidence to answer these questions focused on comparing exposure point concentrations (EPCs) for metals and pesticides\PCBs with direct contact toxicity reference values (TRVs) for plants and soil invertebrates, and modeled dietary exposure doses with no adverse effects level (NOAEL) TRVs for wildlife.

The conservative assumptions utilized in the screening steps of the risk assessment were replaced by more environmentally realistic exposure assumptions for direct contact and wildlife dose modeling to be performed in the BERA. For direct contact exposure evaluation, the risk questions focused on evaluation of exposure to the maximum concentrations. Because plants and soil invertebrates are not motile, maximum concentrations were used to evaluate the worst potential exposure scenarios. For wildlife dose modeling,the dietary exposure evaluation was performed as described in Appendix D and focused on COPECs that exceed soil screening levels. Both conservative and representative models were run to more thoroughly characterize risk. Conservative models used maximum COPEC concentrations for EPCs, and representative models used mean concentrations of COPECs for EPCs. Representative models still provided conservative exposure and risk estimates because sampling was biased toward areas of known or suspected contamination.

The study design for the BERA identifies the measurement endpoints for evaluating ecological risk, thereby completing the ECSM. The ECSM then helps identify the types and amount of data needed to evaluate ecological risk. Finally, the data quality objectives (DQOs) are defined and the sampling plan developed.

3.1 MEASUREMENT ENDPOINTS

Measurement endpoints are measurable ecological characteristics that are related to the valued characteristics selected as the assessment endpoints (USEPA 1997). The two components of measurement endpoints include:

- Measures of exposure (e.g., concentrations of a contaminant in soil) and
- Measures of effect (e.g., survival, growth or reproduction of a receptor population).

Survival, growth and reproduction are measures of effects that can be used to assess the viability and function of receptor populations. These are the measures of effects used to estimate risk.

The selection of the measurement endpoints incorporates species/community/habitat considerations, the relationship of the endpoints to the COPECs and mechanisms of ecotoxicity. Concentrations of COPECs were measured as part of the Site investigation. Wildlife observations identified receptor populations. The measurement endpoints determined to be appropriate for evaluating ecological risks from exposure of receptor populations to COPECs at the East Chicago Site corresponding surrogate wildlife receptors include:

Assessment Endpoint	Measurement Endpoint	Surrogate Receptor Evaluated	Assumptions
1. Viability and function of the terrestrial plant community	Measures of contaminant effects on survival, growth and reproduction based on comparison of COPEC concentrations in soil with toxicity reference concentrations (TRCs) that represent threshold effects levels (TELs) and probable effects levels (PELs)		
2. Viability and function of the soil invertebrate community	(see measurement endpoint #1)		
3. Viability and function of herbivorous bird populations	Measures of contaminant effects on survival, growth and reproduction based on comparison of modeled dietary dose rates, which incorporate COPEC concentrations in soil, with TRVs expressed as NOAELs and LOAELs	Canada goose (*Branta canadensis*)	100% of diet as plant matter

4. Viability and function of invertivorous bird populations	(see measurement endpoint #3)	Song sparrow (*Melospiza melodia*)	25% of diet as plant matter and 75% as invertebrates
5. Viability and function of omnivorous bird populations	(see measurement endpoint #3)	American robin (*Turdus migratorius*)	60% of diet as plant matter and 40% as invertebrates
6. Viability and function of carnivorous bird populations	(see measurement endpoint #3)	Red-tailed hawk (*Buteo jamaicensis*)	100% of diet as small mammals
7. Viability and function of herbivorous mammal populations	(see measurement endpoint #3)	Groundhog (*Marmota monax*) and white-tailed deer (*Odocoileus virginianus*)	100% of diet as plant matter
8. Viability and function of invertivorous mammal populations	(see measurement endpoint #3)	Short-tailed shrew (*Blarina brevicauda*)	100% of diet as invertebrates
9. Viability and function of omnivorous mammal populations	(see measurement endpoint #3)	Deer mouse (*Peromyscus maniculatus*	50% of diet as plant matter and 50% as invertebrates
10. Viability and function of carnivorous mammal populations	(see measurement endpoint #3)	Red fox (*Vulpes vulpes*)	100% of diet as small mammals

Sources of TRCs for measures of effect from direct exposure of terrestrial plants and soil invertebrates included:

- Eco-SSLs (USEPA 2005) and
- ORNL Ecotoxicological Screening Benchmarks for plants and soil invertebrates (Efroymson et al. 1997a and 1997b).

Priority was given to Eco-SSLs.

Toxicity reference values, expressed as NOAELs and LOAELs, used in the dose rate models will be identified from a number of primary literature sources including, but not limited to, Baes et al. 1984, Bechtel 1998a and 1998b, Beyer 1990, Beyer et al. 1994, Efroymson et al. 2001, Nagy 1987 and 2001, Sample and Suter 1994, Sample et al. 1998a, 1998b and 1999, Schafer et al. 1983, and Travis and Arms 1988. Selection of TRVs is described in Appendix E.

3.2 STUDY DESIGN

The general question addressed is whether concentrations of COPECs in soil may be sufficient to cause adverse effects in terrestrial ecological receptors. The lines of evidence used to address this question included:

- Comparing exposure point concentrations in soil with effects levels of constituents,
- Comparing modeled dietary dose rates, based on concentrations of constituents in soil, with known effects dose rates, and
- Qualitative evaluations of terrestrial plant communities on-Site.

Soil data collected in 1999, 2003 and 2006 were used to evaluate measures of exposure and effects. Sample locations from all three studies are presented in Figures 4a and 4b. Ecological evaluation during the SLERA identified 16 SWMUs/AOCs with inadequate or no soil data. In addition, the potential impact of SWMUs/AOCs on the Natural Area was uncertain. Supplemental soil sampling was performed to address these data gaps and evaluate exposure for ecological receptors in these areas. As stated previously, prior investigations had detected metals in soil samples in SWMUs and AOCs adjacent to the Natural Area. Soil samples from the buffer zone that separates the Natural Area from the Re-Development Area, also showed the presence of metals. Based on this information, the Natural Area Buffer Zone was sampled and evaluated in the context of stormwater runoff transport pathways from adjacent on-Site SWMUs and AOCs to the buffer zone.

Separate ecological evaluations were performed for the Restricted Area, Re-Development Area and Natural Area Buffer Zone based on differing future land use plans for each area. Data for all SWMUs and AOCs in the Restricted and Re-Development Areas were pooled for a comprehensive ecological evaluation for each of these areas. Evaluation of individual SWMUs and/or AOCs or EEAs could help identify specific problem areas.

Data for the Natural Area Buffer Zone were evaluated in several ways. Data from 1999, 2003 and 2006 were pooled to evaluate ecological risk for the buffer zone as a whole. The same evaluation was done after removing data from the RNOF-05 transect to evaluate the risk contribution from this runoff transect. Finally, the 25-foot sample locations and 50-foot sample locations were evaluated separately by comparing modeled dietary dose rates with TRVs to characterize risks at increasing distances into the Natural Area Buffer Zone. These strategies were used to identify whether stormwater runoff is a significant migration pathway for COPECs into the Natural Area and determine the extent of risks from COPECs into the Natural Area.

Both surface (0-1 feet) and subsurface (1-2 feet) soil samples were collected. Data from surface samples represent COPEC concentrations to which the majority of wildlife receptors and herbaceous plants may be exposed. Deeper samples represent COPEC concentrations to which burrowing receptors and deeper-rooted plants may be exposed. The majority of ecological evaluations were based on concentrations of constituents in surface soil (0-1 feet). This included evaluations of effects of COPECs on terrestrial plants, because the bulk of the vegetation on the Site consists of shallow rooted herbaceous plants and grasses. However, dietary exposure models for burrowing surrogate receptors (i.e., groundhog and short-tailed shrew) evaluated surface and sub-surface (0-2 feet) constituent concentrations. Upland habitat dominates the potential exposure areas of the Site and the terrain is nearly flat throughout. Seasonal rainfall

events saturate the soil nearly to the surface. Consequently, burrowing wildlife may experience displacement from burrow flooding.

3.3 DATA QUALITY OBJECTIVES (DQOS)

Ecological risk to Site receptors was evaluated using data collected in 1999, 2003 and 2006. New data were collected in 2006 to supplement existing data and fill data gaps. The DQO process for the supplemental soil investigation was performed to ensure that the data collected were adequate to perform the BERA. Additional soil data were collected to ensure that maximum concentrations of COPECs in Site soil were detected and a conservative risk evaluation could be performed. All soil samples collected during this and previous investigations were biased towards areas of known or suspected contamination for conservative risk estimates.

When possible, sample detection limits were specified at concentrations below the USEPA Region 5 ESLs to avoid the uncertainty associated with detection limits greater than ESLs. However, in some cases analytical technology cannot achieve sufficiently low detection limits to avoid this uncertainty entirely. If the detection limit (sample reporting limit) exceeded the screening level and the constituent was a known Site contaminant, a concentration value of one-half the detection limit was used to characterize exposure and risk for both direct contact and ingestion pathways.

As outlined in the BERA Work Plan (WP) (DuPont, 2005b), a data gap analysis was performed that identified data gaps associated with 16 SWMUs/AOCs. Additional samples collected and analyses performed to fill data gaps data are presented in Table 4.4.1-1 of the WP.

4.1 FIELD SAMPLING

Soil samples were collected during Site investigations in October-November 1999, November 2003 and January 2006. Sample collection for 1999 and 2003 is described in the Phase I RFI Report (URS 2002). Additional sample collection to fill data gaps for this BERA in January 2006 is described in the Field Sampling Plan (FSP) (DuPont 2005c).

4.2 SAMPLE ANALYSES AND ANALYTICAL METHODS

Samples from SWMUs and AOCs were analyzed for one or more of the following:

- TAL metals
- pesticides and PCBs
- target compound list (TCL) volatile organic compounds (VOCs)
- pH
- sulfate

The analyses performed on soil from each SWMU or AOC was dependent upon contaminants of interest based on historical operations. Background samples were analyzed for TAL metals. All samples collected from all areas were analyzed for percent moisture.

4.3 ANALYSIS OF ECOLOGICAL EXPOSURES AND EFFECTS

The technical evaluation was performed on soil data collected during Site investigations and was based on potentially complete exposure pathways and receptors at the Site.

4.3.1 Characterizing Ecological Exposures

Ecological exposures in the Re-Development and Restricted Areas were characterized by identifying AOCs/SWMUs where there was the co-occurrence of ecological habitat and elevated levels of contaminants. AOCs and SWMUs were identified based on historical Site operations. Many AOCs/SWMUs have been cleared of building structures, and Site-related activities have been terminated. These areas now support vegetation and invertebrate communities and are being utilized by wildlife. Therefore, they present the potential for exposure of wildlife to Site-related contaminants. Soil samples collected in 1999, 2003 and 2006 were used in the ecological exposure characterization.

Ecological exposures in the Natural Area Buffer Zone were characterized by identifying potential contaminant migration pathways. The primary contaminant migration pathway was stormwater runoff in erosion channels identified leading from the Re-Development and Restricted Areas into the Natural Area Buffer Zone. The Buffer Zone between the Natural Area and former manufacturing and operations area supports dense and diverse vegetation and

wildlife. Soil samples collected from the Natural Area Buffer Zone in 2003 and 2006 were used in the ecological exposure characterization.

Concentrations of detected constituents in Site samples were used for exposure point concentrations (EPCs) in ecological evaluations. A tiered approach was used to characterize ecological exposures. Maximum EPCs were used initially, followed by mean EPCs. Comparisons with maximum media concentrations allowed for the most conservative evaluation, reducing the likelihood that ecological risks would be underestimated. Because sample locations were biased toward areas of known or suspected contamination and because generally fewer than 10 data points for each AOC and SWMu were collected, the 95% upper confidence limit of EPCs that are more commonly used for ecological evaluations could not be calculated. Therefore, the mean was used as a more representative estimate of exposure concentrations. Samples were biased toward areas of higher concentration and evaluations based on mean EPCs were still conservative.

4.3.2 Characterizing Ecological Effects

Ecological effects were characterized for the Restricted Area, Re-Development Area and Natural Area Buffer Zone. Observations during Site visits have indicated that vegetation on-Site in the Restricted and Re-Development Areas may be impacted by contaminants in soil. Small areas on Site are lacking vegetation or have sparse vegetation with little diversity. These areas also contain rubble and ash-like material from former Site operations.

Observations for the Natural Area Buffer Zone have indicated a potential migration pathway for contaminants in erosional areas for stormwater runoff. Concentrations of COPECs in soils in these areas may have adverse effects on ecological receptors. Potential ecological effects are discussed in Appendix E.

Exposure point concentrations were used in conjunction with ecological effects information from the literature to characterize ecological risk. Risks were estimated for direct contact and dietary exposure pathways by comparing potential exposures with known effects levels. The likelihood for adverse effects was described based the magnitude and uncertainty of risk estimates.

5.1 RISK ESTIMATION

5.1.1 Risk Estimation for Direct Exposure Pathways

The direct contact pathway for the soil invertebrate and plant communities was evaluated using highly conservative ESLs for soil based on toxicity studies of plant and invertebrate exposures. Maximum concentrations of COPECs found in surface soil samples were determined for each area and compared with the chosen screening value for each constituent and community.

Hazard quotients (HQs) were calculated to express the potential for direct contact risks to plants and soil invertebrates by dividing the maximum COPEC concentrations by their respective screening levels such that:

$$HQ = \frac{\text{Maximum COPEC Concentration}}{\text{ESL}}$$

In general, COPECs with an HQ < 1.0 pose negligible risk and are associated with minimal uncertainty about the perception of risks to plant and soil invertebrate communities. Descriptions of the extent, magnitude, and potential ecological significance are provided for COPECs with HQs > 1.0. Site-specific evidence of observable effects on the assessment endpoints is also provided to support risk interpretation, when available.

5.1.2 Risk Estimation for Dietary Exposure Pathways

Wildlife dose rate modeling was used to evaluate exposure from wildlife ingestion of food/prey and incidental ingestion of soil as described in Appendix D. Surrogate terrestrial wildlife receptors for the Site were identified during the Problem Formulation for this BERA and were evaluated for dietary exposure. Dose modeling was performed using both the maximum and mean concentrations of COPECs in soil samples. Other model parameters included representative receptor body weights, representative ingestion rates based on an allometric equation, an area use factor (AUF) of 1.0 and concentrations of constituents in food/prey items based on bioaccumulation factors derived from the literature. Water ingestion rates were not included in the models because of the absence water in the areas being evaluated and the fact that this exposure medium does not typically contribute significantly to ecological risk for terrestrial wildlife receptors. Details of the dose model parameters are provided in Table F-1 of Appendix F. Estimated mean and maximum concentrations of COPECs in food/prey for each area on-Site are provided in Tables F-2 through F-23

Data for surface soil (0-1 feet) was used for most dietary exposure models. However, data for surface and sub-surface (1-2 feet) soil was used for exposure models for the short-tailed shrew and the groundhog because they are burrowing receptors. Exposure point concentrations for 0-2 feet were used for both incidental soil ingestion and ingestion of contaminated food/prey items for the short-tailed shrew models, because prey items are found underground, as well. However,

groundhogs only feed on vegetation, and contaminant levels in food are based on concentrations in surface soil. Incidental soil ingestion is still based on surface and sub-surface data because soil ingestion can occur through grooming after being exposed to deeper soil in their burrows.

An HQ was calculated for each wildlife receptor and COPEC by dividing the total estimated COPEC dose by the chronic NOAEL and the chronic LOAEL, expressed as a TRV. Maximum and mean COPEC concentrations were used to calculate the dose for conservative and representative dietary exposure models, respectively. The calculated HQs from both models and for both the NOAEL and LOAEL were used to describe a range of risks to wildlife from ingesting contaminated media and food/prey from representative to conservative.

5.2 RISK DESCRIPTION

5.2.1 Restricted Area

Risk estimates for the direct exposure of plants and invertebrates to COPECs in the Restricted Area are presented in Tables F-24 and F-25 of Appendix F, respectively. Calculations for the dietary exposure models for the Restricted Area are presented in Tables F-26 through F-43 of Appendix F. Results of risk estimates are summarized in Table 1.

Risk estimates for direct exposure of terrestrial plants and soil invertebrates demonstrated that there is potential risk to these receptor communities from all COPECs evaluated. Many of the TRCs used to estimate risks were the same conservative effects concentrations used for the screening level evaluation. Many of the effects concentrations are also based on studies that used soluble forms of constituents and do not provide a good representation of field exposures. Therefore, these risk estimates are highly conservative and should be interpreted with caution. Community evaluations provide a more representative line of evidence for ecological effects from COPECs in soil and were used in addition to direct exposure evaluations. Terrestrial plant communities on-Site showed signs of stress that may be related to soil contaminants for some SWMUs and AOCs. Some areas on-Site were barren or had very sparse vegetation and low plant diversity. These areas were also littered with debris, indicating that these were areas where historical Site activities had occurred. Soil samples were collected from these areas, suggesting that concentrations of some COPECs in these areas may be affecting the plant community.

The first tier of dietary exposure risk estimates used maximum concentrations of COPECs in addition to other highly conservative assumptions. It was determined, based on the first tier of the ecological risk evaluation, that there may be risk to ecological receptors in the Restricted Area from all metal COPECs evaluated, except boron. Ecological risk from organic COPECs (Aroclors 1254 and 1260, DDT and methoxychlor) was determined to be negligible.

Although calculated mean EPCs were still conservative, mean EPCs provided a more realistic estimate of risk. The second tier of evaluation determined that risks to wildlife receptors from barium, boron, chromium, copper, nickel and vanadium are negligible. Risk to wildlife receptors from antimony is uncertain, as NOAEL-based HQs exceeded 1.0, but LOAEL-based HQs did not. The NOAEL TRV represents a no adverse effect level, and the level at which ecological effects are observed lies somewhere between the NOAEL TRV and LOAEL TRV. Therefore, ecological risks are uncertain. Ecological risks from boron are also uncertain, because no scientifically defensible TRVs could be identified.

There is a potential for adverse effects to the following receptors from the following COPECs:

- herbivorous birds – selenium
- invertivorous birds – arsenic, cadmium, lead, selenium, zinc
- omnivorous birds – cadmium, lead, selenium, zinc
- carnivorous birds – *negligible risk*
- herbivorous mammals – selenium
- omnivorous mammals – arsenic, cadmium, lead, selenium, zinc
- invertivorous mammals – arsenic, cadmium, lead, selenium, zinc
- carnivorous mammals – *negligible risk*

In summary, risks from COPECs in soil in the Restricted Area are as follows:

Negligible Risk	Potential for Adverse Effects	Uncertain Potential for Adverse Effects
cyanide	arsenic	antimony
barium	cadmium	
boron	lead	
chromium	selenium	
copper	zinc	
nickel		
vanadium		
Aroclor 1254		
Aroclor 1260		
DDT		
methoxychlor		

Many of the HQs for COPECs for which there is a potential for adverse ecological effects are only up to an order of magnitude greater than 1.0. The HQs for arsenic were less than 10 for all receptors evaluated, and the HQs for cadmium, lead, and zinc were less than 20 for all receptors evaluated except invertivorous birds. Conservative assumptions used for risk calculations probably have resulted in an overestimation of risk. It is likely that ecological risk for most COPECs would be determined to be negligible if more realistic assumptions were used. There are multiple sources of uncertainty in ecological risk assessments, as described in Section 5.3. Risks identified may also be attributed to localized soil contamination from historical operations associated with specific SWMUs and AOCs.

5.2.2 Re-Development Area

The following constituents were identified as COPECs for further evaluation in the BERA:

DDT	boron	mercury
methoxychlor	cadmium	nickel
cyanide	chromium	selenium
	cobalt	silver
antimony	copper	thallium
arsenic	lead	vanadium
barium	manganese	zinc

Risk estimates for the direct exposure of plants and invertebrates to COPECs in the Re-Development Area are presented in Tables F-44 and F-45 of Appendix F, respectively. Calculations for the dietary exposure models for the Restricted Area are presented in Tables F-46 through F-63 of Appendix F. Results of risk estimates are summarized in Table 2.

Risk estimates for direct exposure of terrestrial plants and soil invertebrates demonstrated that there may be risk to these receptor communities from all COPECs evaluated, except mercury. As discussed for the Restricted Area, this is a very conservative assessment based on TRCs used and assumptions associated with bioavailability.

The first tier of dietary exposure risk estimates used maximum concentrations of COPECs in addition to other highly conservative assumptions. It was determined, based on the first tier of the ecological risk evaluation, that risks to ecological receptors in the Re-Development Area from boron, cobalt, manganese, nickel, vanadium and methoxychlor are negligible.

Although calculated mean EPCs were still conservative, mean EPCs provided a more realistic estimate of risk. The second tier of evaluation determined that risks to wildlife receptors from chromium, silver and DDT are negligible. Barium, copper, mercury and thallium each had a NOAEL-based HQ that was nominally greater than 1.0 for one receptor. Because the NOAEL TRV represents a no adverse effect level, and the level at which ecological effects are observed lies somewhere between the NOAEL TRV and LOAEL TRV. Therefore, risk was considered uncertain and additional ecological evaluation is necessary to be conclusive. Risk from antimony was also determined to be uncertain because NOAEL-based HQs exceeded 1.0 but LOAEL-based HQs did not.

There is a potential for adverse effects to the following receptors from the following COPECs:

- herbivorous birds – lead
- invertivorous birds – arsenic, cadmium, lead, selenium, zinc and cyanide
- omnivorous birds – cadmium, lead, selenium, zinc and cyanide
- carnivorous birds – cyanide
- herbivorous mammals – *negligible risk*

- omnivorous mammals – arsenic, cadmium, lead, selenium and zinc
- invertivorous mammals – arsenic, cadmium, lead and zinc
- carnivorous mammals – *negligible risk*

In summary risks from COPECs in soil in the Re-Development Area are as follows:

Negligible Risk	Potential for Adverse Effects	Uncertain Potential for Adverse Effects
boron	arsenic	antimony
chromium	cadmium	barium
cobalt	lead	copper
manganese	selenium	thallium
nickel	zinc	mercury
silver	cyanide	
vanadium		
DDT		
methoxychlor		

As with the Restricted Area, many of the HQs for COPECs for which there is a potential for adverse ecological effects are only up to an order of magnitude greater than 1.0. Arsenic, selenium and cyanide all HQs less than 10 for all receptors. Cadmium, lead and zinc had HQs less than 20 for all receptors evaluated except invertivorous and omnivorous birds. Again, it is likely ecological risk from most COPECs would be determined to be negligible if more realistic assumptions were used.

5.2.3 Natural Area Buffer Zone

Risk estimates for the direct exposure of plants and invertebrates to COPECs in the Natural Area Buffer Zone are presented in Tables F-64 and F-65 of Appendix F, respectively. Calculations for the dietary exposure models are presented in Tables F-66 through F-83 of Appendix F. Results of risk estimates are summarized in Table 3.

Risk estimates for direct exposure of terrestrial plants and soil invertebrates demonstrated that there may be risk to these receptor communities from most COPECs evaluated. Risk from barium, beryllium and nickel were negligible. As discussed for the other Site areas, this is a very conservative assessment based on TRCs used and assumptions associated with bioavailability. Evaluation of the terrestrial plant communities in the Natural Area Buffer Zone showed no obvious signs of stress. Vegetation in the Buffer Zone was dense and diverse, and species were characteristic of a transitional community.

The first tier of dietary exposure risk estimates used maximum concentrations of COPECs in addition to other highly conservative assumptions. It was determined, based on the first tier of

the ecological risk evaluation, that risks to wildlife receptors in the Natural Area Buffer Zone from barium, chromium, cobalt, nickel and vanadium are negligible.

Although still conservative, calculated mean EPCs provided a more realistic estimate of risk. The second tier of evaluation determined that risks to wildlife receptors from antimony, arsenic, copper, manganese, silver and thallium are negligible. Risk to invertivorous birds from mercury is uncertain, as NOAEL-based HQs exceeded 1.0, but LOAEL-based HQs did not. The NOAEL TRV represents a no adverse effect level, and the level at which ecological effects are observed lies somewhere between the NOAEL TRV and LOAEL TRV. Therefore, ecological risks are uncertain.

There is a potential for adverse effects to the following wildlife receptors from the following COPECs:

- invertivorous birds - cadmium, lead, selenium and zinc
- omnivorous birds – cadmium, lead and zinc
- omnivorous mammals – cadmium and lead
- invertivorous mammals – cadmium, lead and zinc
- *Risk to all other receptor groups is negligible.*

In summary, the potential for adverse ecological effects on populations of wildlife receptors from COPECs in soil in the Natural Area Buffer Zone are as follows:

Negligible Risk	Potential for Adverse Effects	Uncertain Potential for Adverse Effects
antimony	cadmium	mercury
arsenic	lead	
chromium	selenium	
cobalt	zinc	
copper		
manganese		
nickel		
silver		
thallium		
vanadium		

Many of the HQs for COPECs for which there is a potential for adverse ecological effects are only up to an order of magnitude greater than 1.0. The HQs for selenium did not exceed 3.0 for any receptors evaluated. The HQs for cadmium, lead and zinc were less than 20 for all receptors evaluated except invertivorous birds. It is likely ecological risk would be determined to be negligible if more realistic assumptions were used.

Closer examination of the data revealed that runoff transect RNOF05 contributes significantly to potential risk in the Natural Area Buffer Zone. RNOF05 is a low-lying area along the fenceline between the former manufacturing and operations area and the Buffer Zone. Stormwater appears to collect in this area. If data for RNOF05 are eliminated from risk estimates, HQs are reduced significantly, the number of receptor groups potentially affected is reduced and risks from cadmium and selenium are uncertain because only NOAEL-based HQs exceeded 1.0 (Table F-84 through F-101 of Appendix F and Table 4). It is unlikely that ecological receptor populations on-Site would have significant exposure to contaminated soil in the RNOF05 because it covers a very small portion of the overall area in the Natural Area Buffer Zone.

Data from sample locations 25 and 50 feet into the Natural Area Buffer Zone were evaluated separately to help characterize risks and confirm that stormwater runoff is a potential migration pathway for COPECs. Tables 5 and 6 present the summary of risk calculations, which are presented in Tables F-102 through F-137 of Appendix F. The HQs were much lower for data collected 50 feet into the Natural Area Buffer Zone. At 25 feet into the Buffer Zone, there was a potential for adverse ecological effects from exposure to cadmium, copper, lead, mercury, selenium and zinc. Fifty feet into the Buffer Zone, there was only a potential for adverse effects from exposure to camium, lead and zinc. This indicates that stormwater runoff is a potential migration pathway for COPECs and that the spread of contamination and potential for adverse ecological effects diminishes rapidly with increasing distance into the Natural Area Buffer Zone. Overall, the potential for adverse effects to wildlife in the Natural Area Buffer Zone are relatively small.

5.2.4 Summary

Results of the BERA indicated a potential for adverse ecological effects to wildlife receptors from:

- Five metals in the Restricted Area,
- Six inorganic constituents in the Re-Development Area and
- Four metals in the Natural Area Buffer Zone.

Direct contact exposure estimates indicate a potential for adverse effects on the plant and soil invertebrate communities. However, these estimates are based on effects levels for soluble forms of constituents and use maximum concentrations of COPECs in soil as the EPCs. Site visits have demonstrated a dense and diverse plant community throughout many of the potential ecological exposure areas on-Site. It is likely that the small barren areas on-Site are co-located either with maximum COPEC concentrations or maximum bioavailability of COPECs in soil. A qualitative evaluation of the plant communities on-Site would demonstrated that impacts to plant communities are very localized, and impacts to plant communities in the Natural Area Buffer Zone are negligible.

Many of the HQs for dietary exposure to COPECs for which there is a potential for adverse ecological effects are only up to an order of magnitude greater than 1.0. It is likely ecological risk would be determined to be negligible if more realistic assumptions were used for risk estimates. More realistic assumptions include using:

- site specific dietary exposure data,

- more realistic AUFs (i.e., considering home ranges and seasonality),
- more realistic bioavailability assumptions,
- more appropriate TRVs and
- more realistic exposure point concentrations.

For these models, highly conservative bioaccumulation factors were used to estimate COPEC concentrations in food/prey; AUFs of 1.0 were used to assume exposure for 100% of the receptors time; it was assumed that100% of the total concentrations of COPECs in exposure media are bioavailable; and exposure point concentrations were biased towards areas of higher concentration. Characterization of contamination on-Site would most likely indicate that mean concentrations across the Site are lower than what was assumed. These uncertainties are discussed in more detail in Section 5.3.

Based on the results of this evaluation, it was determined that:

- Contaminant transport from stormwater runoff toward the Natural Area is limited.
- Ecological risks in the Natural Area Buffer Zone are limited.
- The potential for adverse effects to ecological receptors in the Natural Area Buffer Zone decreases rapidly with increasing distance into the Natural Area.
- Concentrations of five COPECs in soil from former Site operations have the potential to cause adverse effects in wildlife populations exposed to soil in the Restricted Area.
- Concentrations of six COPECs in soil from former Site operations have the potential to cause adverse effects in wildlife populations exposed to soil in the Re-Development Area.

5.3 UNCERTAINTY ANALYSIS

Multiple sources of uncertainty can affect the perception of calculated risks. The following sources of uncertainty have been identified for the risk calculations in this BERA:

Conservative Toxicity Reference Values

Source of uncertainty: Many of the plant and soil invertebrate screening values are based on studies of soluble forms of constituents, resulting in observable effects at low concentrations.

Uncertainty: "False positive" identification of COPECs may have occurred because overly conservative plant and invertebrate screening values were used to evaluate risks to the terrestrial plant and soil invertebrate communities. A review of alternative ecotoxicity data/literature may help identify more realistic effects concentrations based on studies of soil exposures, which take limited bioavailability of constituents in soil into consideration.

Variability in Exposure Responses

Source of uncertainty: There may be variability in sensitivity between Site receptors and ecotoxicity test species from which TRVs were derived.

Uncertainty: Natural variation in sensitivity between species may have resulted in an overestimate or underestimate of risk for a receptor group. Due to the limited availability of

information on differences in response between species, the relationship between responses in different species can not be quantified, and no solution is available.

Assumptions for Dietary Exposure Models

Source of uncertainty: Dietary exposure models use highly conservative assumptions including:

- EPCs are maximum COPEC concentrations in soil
- AUF = 1.0
- COPEC concentrations in soil and food/prey are 100% bioavailable
- 100% bioaccumulation of COPECs in soil invertebrate tissue from soil
- most conservative bioaccumulation models for estimating COPEC concentrations in plants and small mammal tissue

Uncertainty: Highly conservative model parameters have resulted in an overestimate of risk. More realistic parameters for dietary exposure models could include:

- mean COPEC concentration for EPCs,
- bioavailability adjustment factors for a more realistic model of dietary uptake,
- seasonal AUFs and AUFs based on home ranges, and
- measured concentrations of COPECs in plant, invertebrate and small mammal tissue that are Site-specific.

Mean COPEC concentrations were used for EPCs for this risk assessment for a more realistic estimate of risks. However, AUFs =1.0, the assumption of 100% bioavailability of COPECs in exposure media and conservative bioaccumulation factors most likely resulted in an overestimate of risk.

Background Levels of Constituents

Source of uncertainty: Risk calculations are based on comparisons with effects levels that are below natural background levels of constituents for the region, particularly for metals.

Uncertainty: Risk may be overestimated if Site concentrations of constituents are similar to background concentrations yet greater that effects concentrations identified in the literature. For this study, concentrations of metal COPECs were compared with background concentrations of metals in samples collected from within the Natural Area and data collected by Shacklette and Boerngen (1984) for the Eastern United States (U.S.) (Table 7). Detected concentrations in background samples from the Natural Area were within the ranges of background concentrations for the Eastern U.S (Table 7). Concentrations of cadmium, lead, selenium and zinc, which were identified as COPECs, in the Natural Area Buffer Zone are higher than background levels for the Natural Area and Eastern U.S. Concentrations of arsenic, cadmium, lead, selenium and zinc, which were identified as COPECs, in the Restricted and Re-Development Areas were higher than background levels, as well. This indicated that COPEC concentrations in the former industrial area are elevated above background levels and the potential for adverse ecological effects is Site-related. However, concentrations of COPECs in the Natural Area Buffer Zone are within the range of natural background levels.

Off-Site Sources of Contamination

Source of uncertainty: Concentrations of COPECs on-Site may be partially or fully from off-Site sources.

Uncertainty: Ecological risk from the result of historical Site operations may be overestimated if concentrations of COPECs on-Site are partially or totally the result of contaminant migration from off-Site sources. Potential off-Site sources of contamination were identified. The Site is located in one of the major industrial centers along the Great Lakes. Industries in the vicinity of the Site include steel mills, petroleum refineries and chemical manufacturing/processing plants. U.S.S Lead to the west is a potential off-Site source of airborne lead contamination in surface soils. The Harbison-Walker Refractories metals facility to the south is a potential source of airborne metals in soil. There are also hazardous waste generators and landfills in the region that may be a source of groundwater contamination and groundwater migration of contaminants to the Site. Many sites within the region have undergone or are undergoing remedial investigation.

Toxicity Data Unavailable

Source of uncertainty: Limited effects data are identified constituents of interest.

Uncertainty: Because of the limited availability of toxicity data, the potential for adverse effects on receptor populations is less certain.

Non-Detects

Source of uncertainty: In some cases non-detected analytes will have detection limits greater than effects concentrations.

Uncertainty: When method detection limits are greater than ecological effects levels, risk from a constituent is uncertain because the concentration of constituent in the environment can not be determined. When possible, method detection limits were set at or below screening values in order to meet DQOs. Sometimes, the analytical technology does not allow detection of constituents below screening levels. When constituent concentrations are below sample reporting limits, reporting limits can be compared with method detection limits to demonstrate meeting DQOs. In those cases, a normal data distribution of constituent concentrations below the sample reporting limits is assumed, and data are evaluated for ecological risk by comparing one-half the sample reporting limit with effects concentrations.

Exposure Point Concentration

Source of uncertainty: Exposure point concentrations for ecological receptors can not be determined.

Uncertainty: When exposure point concentrations can not be defined, there is a potential to overestimate or underestimate ecological risk. Both maximum and mean of COPEC concentrations were used to calculate dose rates. Both values provide a conservative estimate of risk because sample locations were biased towards areas of known or suspected contamination.

Extent of Exposure Area

Source of uncertainty: The size of the ecological exposure area may be larger or smaller than the home range for surrogate ecological receptors evaluated. Dietary exposure models assume an AUF=1.0.

Uncertainty: This can lead to an overestimate of ecological risk if the exposure area is smaller that the receptor's home range (i.e., AUF<1.0).

Risk Interpretation

Because there are so many sources of uncertainty in the ecological risk estimates, a "weight of evidence" approach was used to identify COPECs. Information evaluated included the following:

- frequency of detection
- frequency at which exposure estimates exceeded effects levels
- contaminant bioavailability
- fate and transport
- extent of exposure area
- comparisons with background data, when available
- evidence community health

A number of factors are considered when using the results of an ecological risk assessment to make risk management decisions and deciding whether a response is necessary including:

- the magnitude of the observed or expected effects of Site releases and the level of organization affected (e.g. individual, local population or community);
- the likelihood that these effects will occur or continue;
- the ecological relationship of the affected area to the surrounding habitat;
- whether or not the affected area is a highly sensitive or ecologically unique environment;
- the recovery potential of the affected ecological receptors and expected persistence of chemicals of concern under present Site conditions; and
- short- and long-term effects of the remedial alternatives on the ecological habitats and receptor on-Site and the surrounding ecosystem.

The results of the risk characterization indicated that there is a potential for adverse effects on certain local populations and communities of ecological receptors in the Restricted and Redevelopment Areas of the Site from six metal COPECs. Early successional plant communities have become established throughout these areas since Site operations have been terminated and structures removed. Vegetated areas provide habitat for a variety of wildlife including small mammals, deer, songbirds and raptors.

Re-Development Area

Future land use plans for the Re-Development Area are to remove vegetation, lay pavement and construct buildings. Redevelopment will create an impenetrable barrier between contaminated soil and ecological receptors, removing the exposure pathway and eliminating potential risk that is currently present.

Restricted Area

Future land use plans for the Restricted Area are to leave this portion of the property undeveloped, due to the presence of landfills. The potential for adverse effects from five metal COPECs will be addressed in the Corrective Measures Study (CMS) under the RCRA program.

The Grand Calumet Riparian Buffer Zone was included in the NRD assessment of the Grand Calumet River, and risk management for this portion of the Site is being addressed elsewhere. The CMS will address potential groundwater migration of contaminants to the riparian Buffer Zone.

Natural Area Buffer Zone

The Natural Area is included in the NRD settlement, and is being managed by the Indiana Nature Conservancy. Several threatened and endangered species have been identified in this 172-acre area. The potential for off-Site migration of Site-related constituents is limited due to the topography and hydrogeology of the area. However, there may be limited migration of some contaminants into the Natural Area Buffer Zone from transport through stormwater runoff. The potential for adverse ecological effects from this contaminant migration pathway is minor, as reflected in the low HQs calculated using highly conservative assumptions, and spatially limited

to runoff areas. Most remedial alternatives would result in natural resource damage that would be much greater than the potential for adverse ecological effects.

Conclusions from this BERA include the following:

1. No further evaluation or remedial action is necessary for the Natural Area Buffer Zone. Contaminant migration through the Natural Area Buffer Zone via stormwater runoff is limited. Because contaminant transport to the Natural Area Buffer Zone is limited, the potential for adverse ecological effects from Site-related contaminants is low and diminishes rapidly (over 25 feet) with increasing distance into the Buffer Zone. Most remedial alternatives would result in natural resource damage that would be much greater than risk to ecological receptor populations.
2. No further evaluation or remedial action is necessary for the Re-Development Area. There is a potential for adverse ecological effects from six inorganic COPECs in this area. However, development of this portion of the property will remove exposure pathways and eliminate risk to ecological receptors.
3. There is a potential for adverse ecological effects from five metal COPECs in the Restricted Area. These ecological risks will be addressed as part of the CMS for the East Chicago Site.

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Table 1
Summary of Risk Estimates for the Restricted Area
DuPont East Chicago Site
East Chicago, Indiana

COPCs from Screen	Number of Samples	Detection Frequency (%)	Maximum Exposure Point Concentration (mg/kg dry weight)	Plant Direct Contact Screening[a] (HQ)	Soil Invertebrate Direct Contact Screening[a] (HQ)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
						Birds								Mammals									
						Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
						NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Metals																							
Antimony	44	80	884	176.8	11.3	--	--	--	--	--	--	--	--	<1	<1	<1	<1	8.00	1.60	10.1	2.01	<1	<1
Arsenic	44	91	62000	3444	1033	29.7	7.43	234	58.6	77.4	19.3	<1	<1	11.6	5.7	3.36	1.65	70.6	34.7	202	99.4	10.3	5.05
Barium	44	100	7720	15.4	23.4	<1	<1	1.57	<1	<1	<1	<1	<1	1.29	<1	<1	<1	4.83	<1	4.41	<1	<1	<1
Boron	16	69	118	236	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	44	95	1020	31.9	7.29	1.87	<1	147	13.2	54.2	4.88	<1	<1	<1	<1	<1	<1	36.2	26.0	44.7	32.1	<1	<1
Chromium	44	100	234	234	585	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.28	<1	1.85	<1	<1	<1
Copper	44	100	4470	44.7	74.5	<1	<1	2.94	1.57	1.08	<1	<1	<1	<1	<1	<1	<1	3.02	2.34	7.22	5.59	<1	<1
Lead	44	100	58300	486	34.3	21.0	4.21	283	56.7	98.2	19.6	1.72	<1	1.93	<1	<1	<1	29.0	12.3	53.0	22.5	1.71	<1
Nickel	44	93	569	19.0	2.85	<1	<1	1.38	1.03	<1	<1	<1	<1	<1	<1	<1	<1	1.20	<1	1.51	1.13	<1	<1
Selenium	44	68	902	902	12.9	77.5	38.8	222	111	237	118	1.70	<1	134	45	38.6	12.9	345	115	95.9	32.0	11.4	3.81
Vanadium	44	100	412	206	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.61	1.1	<1	<1
Zinc	44	98	120000	2400	1200	29.0	3.21	218	24.1	89.3	9.88	1.14	<1	1.84	<1	<1	<1	9.23	4.61	16.4	8.22	<1	<1
Organics																							
Aroclor 1254	3	33	0.095	<1	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1260	3	33	0.165	<1	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
DDT	5	40	0.0	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methoxychlor	4	50	1.87	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

COPCs from Screen	Number of Samples	Detection Frequency (%)	Mean Exposure Point Concentration (mg/kg dry weight)	Plant Direct Contact Screening[a] (HQ)	Soil Invertebrate Direct Contact Screening[a] (HQ)	BERA Food Chain Model Results (HQs) Based on Mean Contaminant Concentrations																	
						Birds						Mammals											
						Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
						NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Metals																							
Antimony	44	80	105	not done	not done	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	1.20	<1	<1	<1
Arsenic	44	91	2099	not done	not done	1.05	<1	8.99	2.25	3.10	<1	<1	<1	<1	<1	<1	<1	3.18	1.56	7.62	3.74	<1	<1
Barium	44	100	975	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	16	69	26	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	44	95	125	not done	not done	<1	<1	35.6	3.20	13.2	1.19	<1	<1	<1	<1	<1	<1	8.97	6.44	10.8	7.73	<1	<1
Chromium	44	100	29.1	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	44	100	518	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.09	<1	<1	<1
Lead	44	100	9443	not done	not done	3.51	<1	54.8	11.0	19.4	3.88	<1	<1	<1	<1	<1	<1	6.07	2.58	10.1	4.31	<1	<1
Nickel	44	93	61.1	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	44	68	142	not done	not done	10.3	5.15	37.2	18.6	33.9	17.0	<1	<1	17.5	5.85	5.06	1.69	51.0	17.0	20.3	6.76	1.82	<1
Vanadium	44	100	55.2	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	44	98	22555	not done	not done	6.96	<1	61.3	6.78	27.5	3.05	1.01	<1	<1	<1	<1	<1	3.31	1.66	4.40	2.20	<1	<1
Organics																							
Aroclor 1254	3	33	0.0	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1260	3	33	0.1	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
DDT	5	40	0.0	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methoxychlor	4	50	1	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Note: All models are based on 0-2 foot data because samples were collected at 2-foot intervals during 1999 and 2003 sampling events

Table 2
Summary of Risk Estimates for the Re-Development Area
DuPont East Chicago Site
East Chicago, Indiana

COPCs from Screen	Number of Samples	Detection Frequency (%)	Maximum Exposure Point Concentration (mg/kg dry weight)	Plant Direct Contact Screening[a] (HQ)	Soil Invertebrate Direct Contact Screening[a] (HQ)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
						Birds								Mammals									
						Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
						NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Metals																							
Antimony	67	90	7360	1472	94.4	--	--	--	--	--	--	--	--	1.20	<1	<1	<1	66.4	13.3	83.8	16.8	<1	<1
Arsenic	79	100	99400	5522	1657	47.6	11.9	372	93.0	122	30.6	1.40	<1	18.5	9.09	5.34	2.62	110	54.27	322	158	16.4	8.06
Barium	66	100	13900	27.8	42.1	<1	<1	2.83	1.42	1.68	<1	<1	<1	2.32	<1	<1	<1	8.69	1.74	7.95	1.59	<1	<1
Boron	4	50	69.3	138.6	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	57	100	5930	185	42.4	9.36	<1	496	44.7	181	16.3	1.23	<1	1.91	1.38	<1	<1	118	84.8	152	109	1.27	<1
Chromium	57	100	895	895	2238	<1	<1	1.66	<1	<1	<1	<1	<1	<1	<1	<1	<1	4.90	<1	7.07	1.41	<1	<1
Cobalt	14	100	22.6	2	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	66	100	5100	51.0	85	<1	<1	3.32	1.77	1.21	<1	<1	<1	<1	<1	<1	<1	3.35	2.60	8.18	6.34	<1	<1
Lead	66	100	147000	1225	86.5	52.6	10.5	661	132	227	45.4	2.77	<1	4.70	2.00	1.36	<1	64.9	27.6	124	52.8	4.18	1.77
Mercury	14	100	52.1	174	521	<1	<1	4.07	2.01	1.87	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	14	100	485	<1	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	52	100	122	4.07	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	52	96	239	239	3.41	18.2	9.09	61.0	30.5	58.4	29.2	1.03	<1	31.1	10.4	8.97	2.99	86.9	29.0	31.2	10.4	3.00	<1
Silver	14	86	100	50.0	--	<1	<1	2.60	<1	1.14	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	14	100	7.21	7.2	--	--	--	--	--	--	--	--	--	<1	<1	<1	<1	4.25	<1	5.46	1.09	<1	<1
Vanadium	52	100	152	76.0	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	71	100	130000	2600	1300	31.1	3.44	233	25.8	95.0	10.5	1.14	<1	1.95	<1	<1	<1	9.75	4.87	17.6	8.81	<1	<1
Organics																							
DDT	14	93	2.4	--	--	<1	<1	1.01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methoxychlor	13	62	0.512	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Other																							
Cyanide	9	56	58.0	--	--	3.83	2.93	26.6	20.3	17.4	13.3	8.87	6.78	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

COPCs from Screen	Number of Samples	Detection Frequency (%)	Mean Exposure Point Concentration (mg/kg dry weight)	Plant Direct Contact Screening[a] (HQ)	Soil Invertebrate Direct Contact Screening[a] (HQ)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
						Birds						Mammals											
						Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
						NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Metals																							
Antimony	67	90	186	not done	not done	--	--	--	--	--	--	--	--	<1	<1	<1	<1	1.68	<1	2.11	<1	<1	<1
Arsenic	79	100	1773	not done	not done	<1	<1	7.67	1.92	2.65	<1	<1	<1	<1	<1	<1	<1	2.74	1.35	6.49	3.19	<1	<1
Barium	66	100	1693	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.06	<1	<1	<1	<1	<1
Boron	4	50	32	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	57	100	163	not done	not done	<1	<1	42.4	3.82	15.8	1.42	<1	<1	<1	<1	<1	<1	10.67	7.67	12.8	9.23	<1	<1
Chromium	57	100	58.6	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	14	100	6.8	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	66	100	578	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.19	<1	<1	<1
Lead	66	100	18943	not done	not done	6.95	1.39	102	20.5	35.9	7.18	<1	<1	<1	<1	<1	<1	11.0	4.68	19.0	8.08	<1	<1
Mercury	14	100	9.56	not done	not done	<1	<1	1.39	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	14	100	244	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	52	100	24.5	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	52	96	10.7	not done	not done	<1	<1	3.61	1.81	2.50	1.25	<1	<1	1.03	<1	<1	<1	4.04	1.35	2.54	<1	<1	<1
Silver	14	86	13.8	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	14	100	1.52	not done	not done	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	1.15	<1	<1	<1
Vanadium	52	100	27.3	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	71	100	18113	not done	not done	5.83	<1	53.0	5.86	24.0	2.66	<1	<1	<1	<1	<1	<1	2.94	1.47	3.78	1.89	<1	<1
Organics																							
DDT	14	93	0.33	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methoxychlor	13	62	0	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Other																							
Cyanide	9	56	18.1	not done	not done	1.19	<1	8.29	6.34	5.43	4.15	2.76	2.11	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Note: Groundhog models are based on 0-3 foot data; all models are based on 0-2 foot data because samples were collected at 2-foot intervals during 1999 and 2003 sampling events

Table 3
Summary of Risk Estimates for the Natural Area Buffer Zone
DuPont East Chicago Site
East Chicago, Indiana

COPCs from Screen	Number of Samples	Detection Frequency (%)	Maximum Exposure Point Concentration (mg/kg dry weight)	Plant Direct Contact Screening[a] (HQ)	Soil Invertebrate Direct Contact Screening[a] (HQ)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
						Birds								Mammals									
						Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
						NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	26	96	273	5.0	78.0	--	--	--	--	--	--	--	--	<1	<1	<1	<1	2.47	<1	4.55	<1	<1	<1
Arsenic	26	96	433	18.0	60.0	<1	<1	2.07	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.72	<1	<1	<1
Barium	13	100	250	500	330	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	26	100	3660	32.0	140	5.96	<1	354.3	31.9	129.8	11.7	<1	<1	1.29	<1	<1	<1	85.2	61.2	108	77.8	<1	<1
Chromium	26	96	42.3	1.0	0.40	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	13	92	50.8	13.0	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	26	100	4470	95.0	54.0	<1	<1	2.94	1.60	1.08	<1	<1	<1	<1	<1	<1	<1	3.02	2.34	7.22	5.6	<1	<1
Lead	26	100	124000	120	1700	44.4	8.89	565	113	195	38.9	2.54	<1	3.99	1.69	1.15	<1	55.9	23.8	106	45.1	3.54	1.50
Manganese	13	100	5690	152	450	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.36	<1	1.37	<1	<1	<1
Mercury	26	96	147	0.30	0.10	1.23	<1	9.01	4.50	3.87	1.92	1.41	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	26	100	26.7	30.0	200	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	26	81	86.3	1.0	70.0	5.98	2.99	23.4	11.7	20.3	10.2	<1	<1	10.2	3.39	2.93	<1	30.9	10.3	13.5	4.50	1.15	<1
Silver	26	77	405	2.0	NA	<1	<1	10.5	3.50	4.60	1.53	<1	<1	<1	<1	<1	<1	2.55	<1	2.66	<1	<1	<1
Thallium	26	50	1.1	1.0	NA	--	--	--	<1	--	--	--	--	<1	<1	<1	<1	<1	<1	2.34	<1	<1	<1
Vanadium	13	92	29.8	2.0	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	26	100	105000	130	120	25.8	2.85	195.2	21.6	80.6	8.92	1.13	<1	1.67	<1	<1	<1	8.43	4.21	14.7	7.33	<1	<1

COPCs from Screen	Number of Samples	Detection Frequency (%)	Mean Exposure Point Concentration (mg/kg dry weight)	Plant Direct Contact Screening[a] (HQ)	Soil Invertebrate Direct Contact Screening[a] (HQ)	BERA Food Chain Model Results (HQs) Based on Mean Contaminant Concentrations																	
						Birds								Mammals									
						Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
						NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	26	96	32.7	not done	not done	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	26	96	45.8	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Barium	13	100	79.5	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	26	100	167	not done	not done	<1	<1	43.1	3.89	16.1	1.45	<1	<1	<1	<1	<1	<1	10.9	7.80	13.1	9.38	<1	<1
Chromium	26	96	12.5	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	13	92	5.9	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	26	100	259	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lead	26	100	6001	not done	not done	2.26	<1	36.6	7.32	13.0	2.61	<1	<1	<1	<1	<1	<1	4.13	1.76	6.00	2.55	<1	<1
Manganese	13	100	549	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mercury	26	96	8.6	not done	not done	<1	<1	1.31	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	26	100	7.6	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	26	81	7.3	not done	not done	<1	<1	2.59	1.30	1.72	<1	<1	<1	<1	<1	<1	<1	2.82	<1	1.93	<1	<1	<1
Silver	26	77	19.8	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	26	50	0.5	not done	not done	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	13	92	9.2	not done	not done	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	26	100	6452	not done	not done	2.60	<1	28.5	3.15	13.2	1.46	<1	<1	<1	<1	<1	<1	1.75	<1	2.00	1.00	<1	<1

Note: Groundhog and short-tailed shrew models are based on 0-2 foot data; all other models are based on 0-1 foot data

Table 4
Summary of Risk Estimates for Natural Area Buffer Zone Without RNOF05
DuPont East Chicago Site
East Chicago, Indiana

COPCs from Screen	Number of Samples	Detection Frequency (%)	Maximum Exposure Point Concentration (mg/kg dry weight)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
				Birds								Mammals									
				Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
				NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	24	96	152	--	--	--	--	--	--	--	--	<1	<1	<1	<1	1.38	<1	3.11	<1	<1	<1
Arsenic	24	96	145	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.7	<1	<1	<1
Barium	11	100	214	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	24	100	81.4	<1	<1	26.6	2.40	9.93	<1	<1	<1	1.29	<1	<1	<1	6.74	4.84	108	77.8	<1	<1
Chromium	24	96	27.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	11	91	5.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	24	100	359	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	7.2	5.6	<1	<1
Lead	24	100	8650	3.23	<1	50.7	10.1	18.0	3.59	<1	<1	3.99	1.69	<1	<1	5.64	2.40	106	45.1	<1	<1
Manganese	11	100	447	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.4	<1	<1	<1
Mercury	24	96	16.5	<1	<1	1.91	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	24	100	26.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	24	25	24.6	1.52	<1	7.49	3.74	5.69	2.84	<1	<1	10.16	3.39	<1	<1	8.95	2.98	13.50	4.50	<1	<1
Silver	24	75	26.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.7	<1	<1	<1
Thallium	24	46	0.44	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	2.3	<1	<1	<1
Vanadium	11	91	23.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	24	100	10400	3.76	<1	37.4	4.14	17.2	1.91	<1	<1	1.7	<1	<1	<1	2.21	1.11	14.66	7.33	<1	<1

COPCs from Screen	Number of Samples	Detection Frequency (%)	Mean Exposure Point Concentration (mg/kg dry weight)	BERA Food Chain Model Results (HQs) Based on Mean Contaminant Concentrations																	
				Birds								Mammals									
				Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
				NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	24	96	13.7	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	24	96	24.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Barium	11	100	66.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	24	100	15	<1	<1	8.69	<1	3.26	<1	<1	<1	<1	<1	<1	<1	2.22	1.60	11.1	7.95	<1	<1
Chromium	24	96	10.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	11	91	2.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	24	100	74	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lead	24	100	1096	<1	<1	8.17	1.63	2.99	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.30	2.3	<1	<1
Manganese	11	100	92	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mercury	24	96	2.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	24	100	7.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	24	25	3.9	<1	<1	1.53	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.59	<1	1.82	<1	<1	<1
Silver	24	75	3.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	24	46	0.4	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	11	91	7.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	24	100	2198	1.19	<1	16.5	1.82	7.63	<1	<1	<1	<1	<1	<1	<1	1.08	<1	1.91	<1	<1	<1

Note: Groundhog and short-tailed shrew models are based on 0-2 foot data; all other models are based on 0-1 foot data

Table 5
Summary of Risk Estimates for Natural Area Buffer Zone 25-Foot Locations
DuPont East Chicago Site
East Chicago, Indiana

COPCs from Screen	Number of Samples	Detection Frequency (%)	Maximum Exposure Point Concentration (mg/kg dry weight)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
				Birds								Mammals									
				Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
				NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	7	100	248	--	--	--	--	--	--	--	--	<1	<1	<1	<1	2.25	<1	2.82	<1	<1	<1
Arsenic	7	86	433	<1	<1	2.07	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.72	<1	<1	<1
Barium	7	100	250	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	7	100	3660	5.96	<1	354	31.9	130	11.7	<1	<1	1.29	<1	<1	<1	85.2	61.2	108	77.8	<1	<1
Chromium	7	86	42.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	7	86	50.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	7	100	4470	<1	<1	2.94	1.57	1.08	<1	<1	<1	<1	<1	<1	<1	3.02	2.34	7.22	5.59	<1	<1
Lead	7	100	124000	44.4	8.89	565	113	195	38.9	2.54	<1	3.99	1.69	1.15	<1	55.9	23.8	106	45.1	3.54	1.50
Manganese	7	100	5690	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.36	<1	1.37	<1	<1	<1
Mercury	7	100	147	1.23	<1	9.01	4.46	3.87	1.92	1.41	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	7	100	26.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	7	100	86.3	5.98	2.99	23.4	11.7	20.3	10.2	<1	<1	10.2	3.4	2.93	<1	30.9	10.3	13.5	4.50	1.15	<1
Silver	7	86	405	<1	<1	10.5	3.51	4.60	1.53	<1	<1	<1	<1	<1	<1	2.55	<1	2.66	<1	<1	<1
Thallium	7	100	1.1	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	2.34	<1	<1	<1
Vanadium	7	86	29.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	7	100	105000	25.8	2.85	195	21.6	80.6	8.92	1.13	<1	1.67	<1	<1	<1	8.43	4.21	14.7	7.33	<1	<1

COPCs from Screen	Number of Samples	Detection Frequency (%)	Mean Exposure Point Concentration (mg/kg dry weight)	BERA Food Chain Model Results (HQs) Based on Mean Contaminant Concentrations																	
				Birds								Mammals									
				Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
				NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	7	100	37.7	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	7	86	73.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Barium	7	100	112.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	7	100	537	1.06	<1	94.9	8.55	35.1	3.16	<1	<1	<1	<1	<1	<1	23.6	16.9	25.6	18.4	<1	<1
Chromium	7	86	14.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	7	86	9.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	7	100	738	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.30	1.01	<1	<1
Lead	7	100	18453	6.77	1.35	100	20.0	35.1	7.02	<1	<1	<1	<1	<1	<1	10.8	4.57	14.3	6.06	<1	<1
Manganese	7	100	938	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mercury	7	100	23.4	<1	<1	2.37	1.17	1.14	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	7	100	11.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	7	100	16.6	<1	<1	5.29	2.64	3.84	1.92	<1	<1	1.31	<1	<1	<1	6.13	2.04	3.02	1.01	<1	<1
Silver	7	86	61.0	<1	<1	1.59	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	7	100	0.3	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	7	86	12.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	7	100	18105	5.83	<1	53.0	5.86	24.0	2.66	<1	<1	<1	<1	<1	<1	2.94	1.47	3.20	1.60	<1	<1

Note: Groundhog and short-tailed shrew models are based on 0-2 foot data; all other models are based on 0-1 foot data

Table 6
Summary of Risk Estimates for Natural Area Buffer Zone 50-Foot Locations
DuPont East Chicago Site
East Chicago, Indiana

COPCs from Screen	Number of Samples	Detection Frequency (%)	Maximum Exposure Point Concentration (mg/kg dry weight)	BERA Food Chain Model Results (HQs) Based on Maximum Contaminant Concentrations																	
				Birds								Mammals									
				Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
				NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	6	100	273	--	--	--	--	--	--	--	--	<1	<1	<1	<1	**2.47**	<1	**4.55**	<1	<1	<1
Arsenic	6	100	163	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Barium	6	100	166	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	6	100	322	<1	<1	**67.1**	**6.04**	**24.9**	**2.24**	<1	<1	<1	<1	<1	<1	**16.8**	**12.0**	**20.4**	**14.6**	<1	<1
Chromium	6	100	29.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	6	100	3.98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	6	100	469	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1.01**	<1	<1	<1
Lead	6	100	5720	**2.16**	<1	**35.1**	**7.01**	**12.5**	**2.50**	<1	<1	<1	<1	<1	<1	**3.97**	**1.69**	**6.46**	**2.75**	<1	<1
Manganese	6	100	428	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mercury	6	100	20.8	<1	<1	**2.20**	**1.09**	**1.06**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	6	100	9.48	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	6	50	9.55	<1	<1	**3.27**	**1.64**	**2.23**	**1.12**	<1	<1	**3.67**	**1.22**	<1	<1	**3.63**	**1.21**	**6.37**	**2.12**	<1	<1
Silver	6	33	21.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	6	100	0.343	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	6	100	8.62	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	6	100	10000	**3.64**	<1	**36.6**	**4.05**	**16.9**	**1.87**	<1	<1	<1	<1	<1	<1	**2.17**	**1.08**	**3.30**	**1.65**	<1	<1

COPCs from Screen	Number of Samples	Detection Frequency (%)	Mean Exposure Point Concentration (mg/kg dry weight)	BERA Food Chain Model Results (HQs) Based on Mean Contaminant Concentrations																	
				Birds								Mammals									
				Herbivore - Canada Goose		Omnivore - Song Sparrow		Omnivore - American Robin		Carnivore - Red-tailed Hawk		Herbivore - Groundhog		Herbivore - White-tailed Deer		Omnivore - Deer Mouse		Invertivore - Short-tailed Shrew		Carnivore - Red Fox	
				NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	6	100	48.4	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	6	100	34.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Barium	6	100	41.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	6	100	59	<1	<1	**21.4**	**1.93**	**8.00**	<1	<1	<1	<1	<1	<1	<1	**5.43**	**3.90**	**5.40**	**3.88**	<1	<1
Chromium	6	100	9.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	6	100	1.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	6	100	93	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lead	6	100	1152	<1	<1	**8.54**	**1.71**	**3.12**	<1	<1	<1	<1	<1	<1	<1	**1.03**	<1	**1.12**	<1	<1	<1
Manganese	6	100	95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mercury	6	100	3.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	6	100	3.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	6	50	2.4	<1	<1	**1.01**	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1.02**	<1	**1.42**	<1	<1	<1
Silver	6	33	4.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thallium	6	100	0.1	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	6	100	5.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	6	100	2860	**1.43**	<1	**18.7**	**2.07**	**8.67**	<1	<1	<1	<1	<1	<1	<1	**1.21**	<1	**1.54**	<1	<1	<1

Note: Groundhog and short-tailed shrew models are based on 0-2 foot data; all other models are based on 0-1 foot data

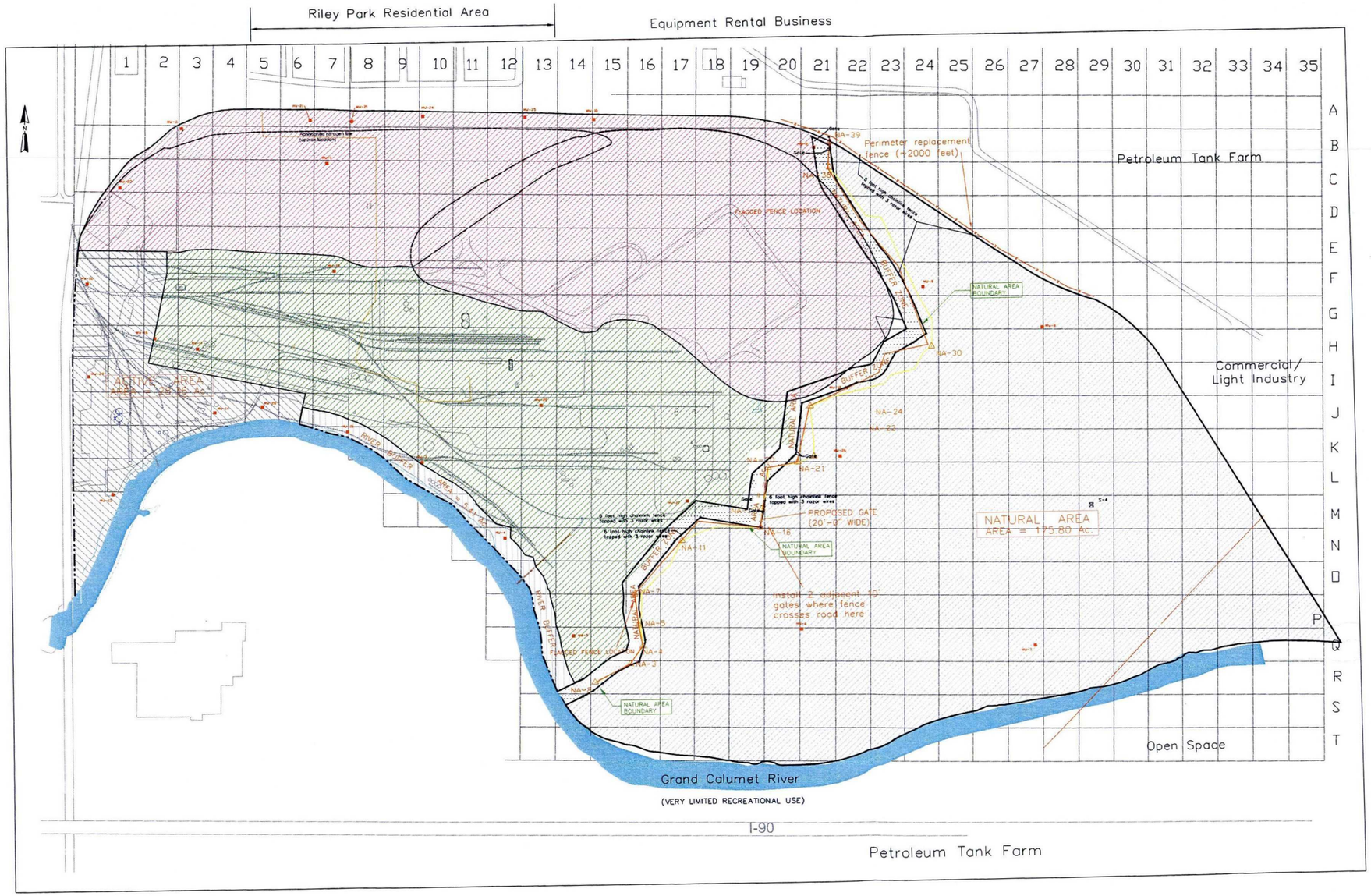
Table 7
Comparison of Site Concentration of Metal COPECs with Background Metal Concentrations
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Units	Redevelopment Area (0-2 feet)		Restricted Area (0-2 feet)		Natural Area Buffer Zone (0-1 feet)		Natural Area Background (0-1 feet)		Eastern US[1] (Surficial)	
		Detection Range	Mean Concentration	Detection Range	Mean Concentration	Detection Range	Mean Concentration	Detection Range	Mean Concentration	Detection Range	Mean Concentration
ANTIMONY	mg/kg	0.964 - 7360	186	3 - 884	105.07	0.285 - 273	32.7	0.744 - 2.08	1.3	<1 - 8.8	0.52
ARSENIC	mg/kg	4.12 - 99400	1773	2.6 - 62000	2052.10	1.6 - 433	45.8	5.2 - 12.9	8.2	<0.1 - 73	4.8
BARIUM	mg/kg	10.2 - 13900	1693	30 - 7720	974.57	3.15 - 250	79.5	22.1 - 34.6	30.3	10 - 1500	290
BERYLLIUM	mg/kg	0.212 - 9.19	2.52			0.0614 - 1.99	0.36	0.203 - 0.302	0.261	<1 - 7	0.55
BORON	mg/kg	50.7 - 69.3	31.8	5.5 - 118	25.77					<20 - 150	31
CADMIUM	mg/kg	0.077 - 5930	163	0.96 - 1020	125.32	0.19 - 3660	167	0.789 - 7.97	4		
CHROMIUM	mg/kg	2.8 - 895	58.6	1.85 - 234	29.12	2.42 - 42.3	12.5	4.15 - 6.58	5.6	1 - 1000	33
COPPER	mg/kg	2.4 - 5100	578	1.89 - 4470	518.15	1.8 - 4470	259	6.94 - 34.2	19	<1 - 700	13
LEAD	mg/kg	40.6 - 147000	18943	13.4 - 58300	9443.08	5.49 - 124000	6001	31 - 138	80	<10 - 300	14
MANGANESE	mg/kg	23.6 - 485	244			8.51 - 5690	549	146 - 304	243	<2 - 7000	260
MERCURY	mg/kg	0.0115 - 52.1	9.56			0.0268 - 147	8.58	0.0252 - 0.0526	0.03	0.01 - 3.4	0.081
NICKEL	mg/kg	0.343 - 122	24.5	1.1 - 569	61.11	0.92 - 26.7	7.57	3 - 4.67	3.91	<5 - 700	11
SELENIUM	mg/kg	0.649 - 239	10.7	1.47 - 902	141.89	0.61 - 86.3	7.28	0.606 - 0.727	0.66	<0.1 - 3.9	0.3
SILVER	mg/kg	0.668 - 100	13.8			0.38 - 405	19.8	0.259 - 0.8	0.5		
THALLIUM	mg/kg	0.0824 - 7.21	1.52			0.0217 - 1.1	0.467	0.109 - 0.158	0.142		
VANADIUM	mg/kg	0.524 - 152	27.3	0.48 - 412	55.19	3.12 - 29.8	9.23	7.4 - 8.76	8.27	<7 - 300	43
ZINC	mg/kg	11.3 - 130000	18113	7.88 - 120000	22555.10	51.9 - 105000	6452	170 - 1950	854	<5 - 2900	40

NOTES:

Mean includes 1/2 MDL for non-detected constituents

1) Shacklette and Boerngen 1984



LEGEND

- Commercial, Industrial (Re-Development Area)
- Deed Restricted Areas
- River Buffer (Non-Development Area)
- Active Manufacturing Area (Grace)
- Natural Area Buffer Zone (Non-Development Area)
- Natural Area

Legend

- DuPont Property Line
- Monitoring Well Location

Total Area = 416.95 acres

SCALE

300' 0 300' 600'

NO.	REVISIONS	BY	DATE

		INITIALS
DESIGNED	R.J. RISTOW	
DRAWN	D.H. ENGLISH	
CHECKED	R.J. RISTOW	
APPROVED(DESIGN)		
APPROVED(CONSTRUCTION)		

DuPont and The W-C Diamond Group

Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

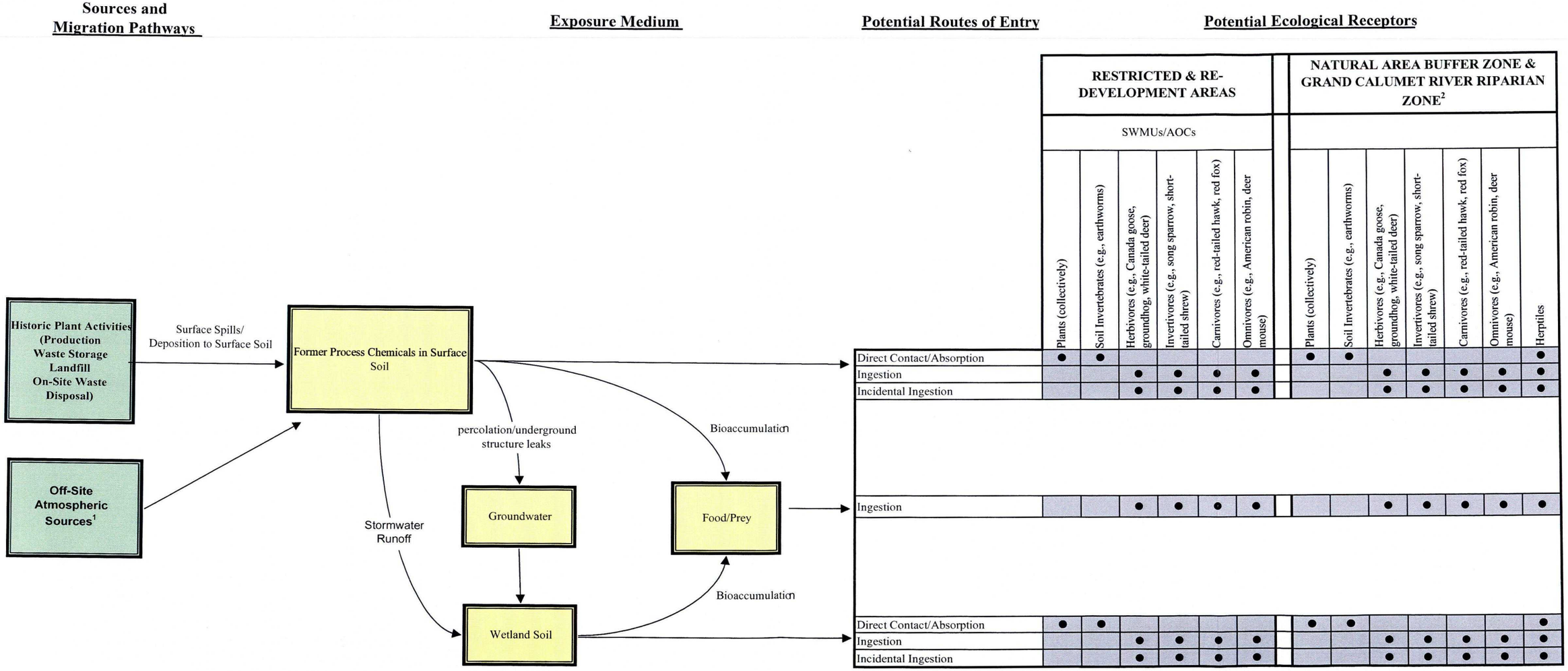
FUTURE LAND USE MAP

DuPont East Chicago Facility
and Northwest Indiana Region
East Chicago, Indiana

SCALE	DATE	DRAWING NO.	FIGURE
1" = 300'	05/07/2003	FIG-7-1	1

Figure 2.
Grand Calumet River Riparian Buffer Zone
DuPont East Chicago Site
East Chicago, Indiana
Photo taken on-Site looking eastward (upstream). The Site is on the left side.

FIGURE 3.
Ecological Conceptual Site Model
DuPont East Chicago Site
East Chicago, Indiana



NOTE:

= COMPLETE MIGRATION PATHWAY

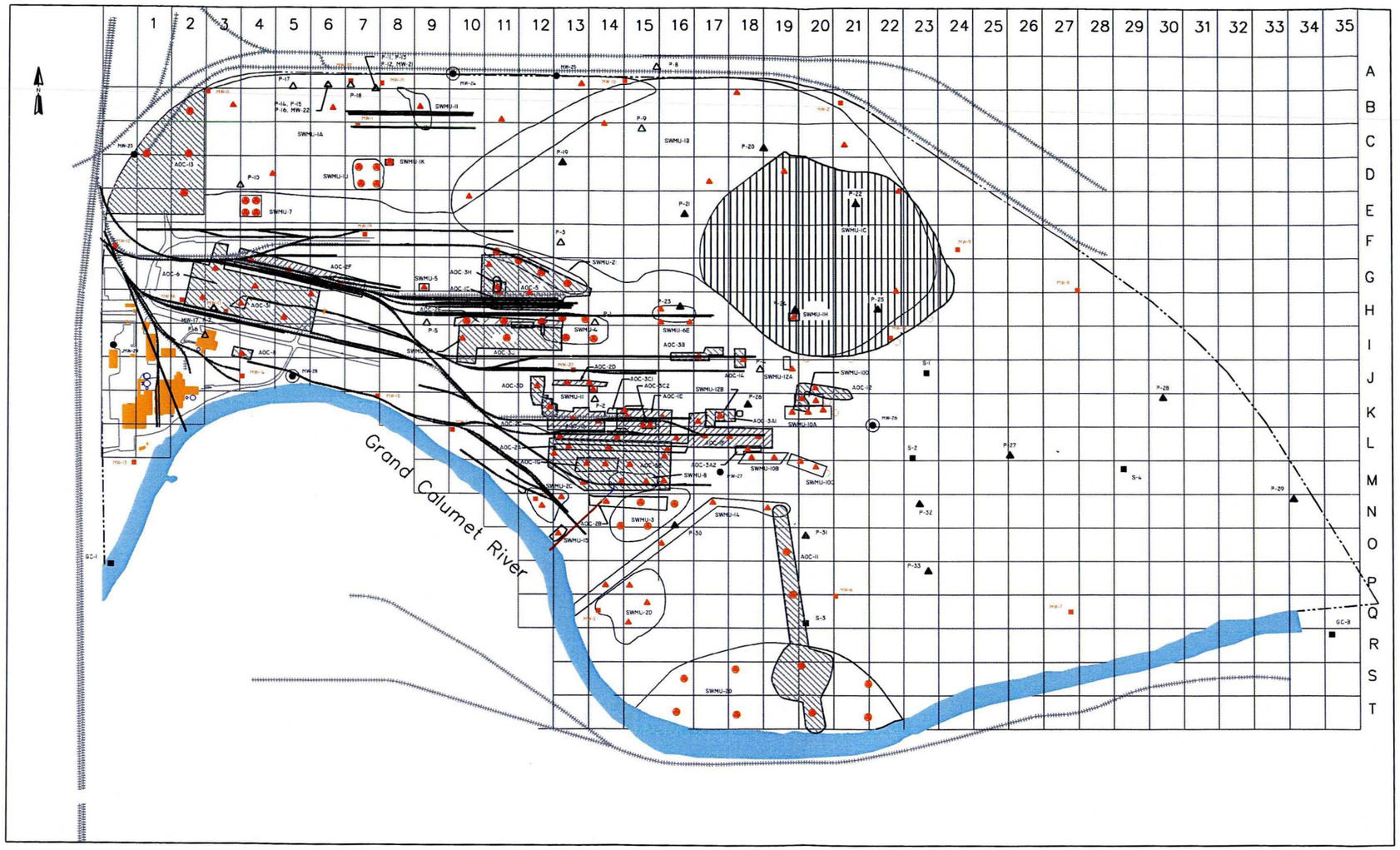
● = PATHWAYS FOR EXPOSURE AND RISK EVALUATION

= INCOMPLETE/INSIGNIFICANT PATHWAYS, NOT RISK EVALUATED

[1] Atmospheric deposition from upwind off-site sources that may include fossil-electric generating stations and metals manufacturing operations

[2] All complete exposure pathways are identified in this ECSM. Risk to the riparian zone is being handled by NRDA and addressed in a corrective measure study (CMS).

Ecological exposures for the Riparian Buffer Zone are likely to occur after restoration activities. Exposure pathways are expected to be insignificant under current habitat conditions.



Notes:
Symbols centered over sample location.
See Figure 3-6b for sampling locations in the southern portion of the plant.

Sources:
DuPont and CH2M HILL

Legend

- DuPont Property Line
- AOC-12 — Areas of Concern
- SWMU-7 — Solid Waste Management Units
- Monitoring Well Location
- Subsurface Sampling Location
- Surface Sampling Location
- Both = (Surface/Subsurface Sampling Location)
- P-25 — New Piezometer
- MW-18 — Existing Monitoring Well
- S-4 — New Staff Gauge
- P-9 — Existing Piezometer
- MW-25 — New Monitoring Well
- P-12, MW-21 — Existing Monitoring Well/Piezometer
- MW-25 — Shelby Tube Sample

0 150 300
FEET

NO.	REVISIONS	BY	DATE
1	Corrected SWMU'S and boring locations labels.	L.R.	05/24/99
	Piezometer locations are approximate.		

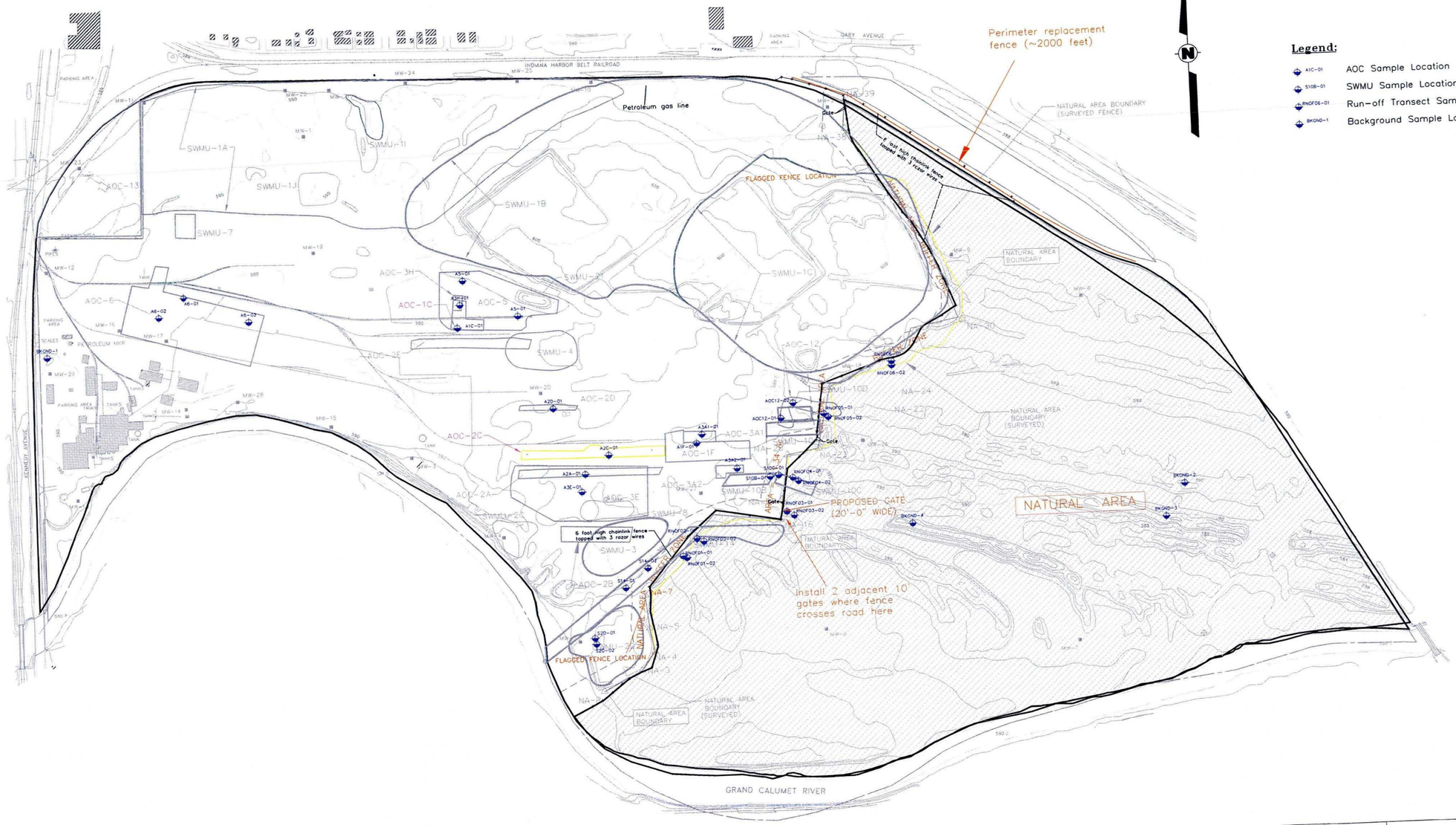
	INITIALS
DESIGNED	
DRAWN D.H.E.	
CHECKED J.R.R.	
APPROVED(DESIGN) A.P.E.	
APPROVED(CONSTRUCTION)	

Corporate Remediation Group
An Alliance between DuPont and URS Diamond
Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

Pre 2006
SWMU and AOC Sampling Locations – Overall Site Map

DuPont East Chicago Facility
and Northwest Indiana Region
East Chicago, Illinois

SCALE	DATE	DRAWING NO.	FIGURE
1" = 300'	Oct 8, 2002	FIG_2-1	4a



DESIGNED	INITIALS
DRAWN DEL	
CHECKED GG	
APPROVED(DESIGN)	
APPROVED(CONSTRUCTION)	

DUPONT

Corporate Remediation Group

An Alliance between DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

2006 BERA SAMPLE LOCATIONS MAP AND SWMU's/AOC's OF INTEREST

East Chicago Facility
East Chicago, Indiana

SCALE	DATE	DRAWING NO.	FIGURE
As Shown	1/27/06	37610009	4b

APPENDIX A
Results of Screen to Refine Constituents for the Baseline Ecological Risk Assessment

Table A-1
Results of the Screen to Refine Constituents of Ecological Concern for the Baseline Ecological Risk Assessment
Restricted Area
DuPont East Chicago Site
East Chicago, Indiana

Parameter[1]	Unit	Screening Value	Screening Value Source	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedences	Location of Detection Max	HQ	COPC Y/N	Notes[3]
1,1,1-TRICHLOROETHANE	MG/KG	29.8	2	0.024	0.024			0.0078	1	5	0	ECH-S-S1C-04S(0-2)	<1	N	
1,1,2,2-TETRACHLOROETHANE	MG/KG	0.127	2			0.006	0.01	0.004	0	5	0		<1	N	
1,1,2-TRICHLOROETHANE	MG/KG	28.6	2			0.006	0.01	0.004	0	5	0		<1	N	
1,1-DICHLOROETHANE	MG/KG	20.1	2			0.006	0.01	0.004	0	5	0		<1	N	
1,1-DICHLOROETHENE	MG/KG	8.28	2			0.006	0.01	0.004	0	5	0		<1	N	
1,2-DICHLOROETHANE	MG/KG	21.2	2			0.006	0.01	0.004	0	5	0		<1	N	
1,2-DICHLOROPROPANE	MG/KG	32.7	2			0.006	0.01	0.004	0	5	0		<1	N	
2,4-DICHLOROPHENOXYACETIC ACID	MG/KG	0.0272	2			0.019	0.02	0.0096	0	5	0		<1	N	
2-HEXANONE	MG/KG	12.6	2			0.011	0.02	0.0077	0	5	0		<1	N	
ACETONE	MG/KG	2.5	2	0.036	0.064			0.0334	3	5	0	ECH-S-S1C-04S(0-2)	<1	N	
BENZENE	MG/KG	0.255	2			0.001	0.001	0.0005	0	5	0		<1	N	
BROMOCHLOROMETHANE	MG/KG	NA	--			0.001	0.001	0.0005	0	5	--		--	N	a
BROMODICHLOROMETHANE	MG/KG	0.54	2			0.001	0.001	0.0005	0	5	0		<1	N	
BROMOFORM	MG/KG	15.9	2			0.001	0.001	0.0005	0	5	0		<1	N	
CARBON DISULFIDE	MG/KG	0.0941	2			0.001	0.001	0.0005	0	5	0		<1	N	
CARBON TETRACHLORIDE	MG/KG	2.98	2			0.001	0.001	0.0005	0	5	0		<1	N	
CHLOROBENZENE	MG/KG	13.1	2			0.001	0.001	0.0005	0	5	0		<1	N	
DIBROMOCHLOROMETHANE	MG/KG	2.05	2			0.001	0.001	0.0005	0	5	0		<1	N	
CHLOROFORM	MG/KG	1.19	2			0.001	0.001	0.0005	0	5	0		<1	N	
CIS-1,2 DICHLOROETHENE	MG/KG	NA	--			0.001	0.001	0.0005	0	5	--		--	N	a
CIS-1,3-DICHLOROPROPENE	MG/KG	0.398	2			0.001	0.001	0.0005	0	5	0		<1	N	
DICHLORODIFLUOROMETHANE	MG/KG	39.5	2			0.001	0.001	0.0005	0	5	0		<1	N	
CHLOROETHANE	MG/KG	NA	--			0.001	0.001	0.0005	0	5	--		--	N	a
ETHYLBENZENE	MG/KG	5.16	2			0.001	0.001	0.0005	0	5	0		<1	N	
HEXANE	MG/KG	NA	--	0.011	0.011			0.0026	1	5	--	ECH-S-S1C-02S(0-2)-DUP	--	N	a
METHYL BROMIDE	MG/KG	0.235	2			0.001	0.001	0.0005	0	5	0		<1	N	
METHYL CHLORIDE	MG/KG	10.4	2			0.001	0.001	0.0005	0	5	0		<1	N	
METHYL ETHYL KETONE	MG/KG	89.6	2			0.001	0.001	0.0005	0	5	0		<1	N	
METHYL ISOBUTYL KETONE	MG/KG	443	2			0.001	0.001	0.0005	0	5	0		<1	N	
METHYLENE CHLORIDE	MG/KG	4.05	2			0.001	0.001	0.0005	0	5	0		<1	N	
STYRENE	MG/KG	4.69	2			0.001	0.001	0.0005	0	5	0		<1	N	
TETRACHLOROETHYLENE	MG/KG	9.92	2			0.001	0.001	0.0005	0	5	0		<1	N	
TOLUENE	MG/KG	5.45	2			0.001	0.001	0.0005	0	5	0		<1	N	
TRANS-1,2-DICHLOROETHENE	MG/KG	0.784	2			0.001	0.001	0.0005	0	5	0		<1	N	
TRANS-1,3-DICHLOROPROPENE	MG/KG	0.398	2			0.001	0.001	0.0005	0	5	0		<1	N	
TRICHLOROETHENE	MG/KG	12.4	2			0.001	0.001	0.0005	0	5	0		<1	N	
TRICHLOROFLUOROMETHANE	MG/KG	16.4	2	0.009	0.009			0.0022	1	5	0	ECH-S-S1C-02S(0-2)-DUP	<1	N	
VINYL CHLORIDE	MG/KG	0.646	2			0.001	0.001	0.0005	0	5	0		<1	N	
XYLENES	MG/KG	1	2			0.001	0.001	0.0005	0	5	0		<1	N	
AROCLOR 1016	MG/KG	0.000332	2			0.019	0.027	0.01	0	3	0		81	N	c
AROCLOR 1221	MG/KG	0.000332	2			0.019	0.027	0.01	0	3	0		81	N	c
AROCLOR 1232	MG/KG	0.000332	2			0.019	0.027	0.01	0	3	0		81	N	c
AROCLOR 1242	MG/KG	0.000332	2			0.019	0.027	0.01	0	3	0		81	N	c
AROCLOR 1248	MG/KG	0.000332	2			0.019	0.027	0.01	0	3	0		81	N	c
AROCLOR 1254	MG/KG	0.000332	2	0.095	0.095			0.04	1	3	1	ECH-S-S1C-04S(0-2)	286	Y	
AROCLOR 1260	MG/KG	0.000332	2	0.165	0.165			0.06	1	3	1	ECH-S-S1C-04S(0-2)	497	Y	
DDD	MG/KG	0.758	2	0.025	0.025			0.01	1	5	0	ECH-E-S1J-03S(0-2)-DUP	<1	N	
DDE	MG/KG	0.596	2	0.00148	0.0141			0.01	2	5	0	ECH-E-S1J-02S(0-2)	<1	N	
DDT	MG/KG	0.0035	2	0.00102	0.00957			0.01	2	5	1	ECH-E-S1J-02S(0-2)	3	Y	
METHOXYCHLOR	MG/KG	0.0199	2	0.272	1.87			0.55	2	4	2	ECH-E-S1J-03S(0-2)-DUP	94	Y	
ANTIMONY	MG/KG	0.27	1	3	884			105	35	44	35	ECH-S-RFI2-A13-2(0-2)	3274	Y	
ARSENIC	MG/KG	18	1	2.6	62000			2052	40	44	34	ECH-S-RFI2-S1J-4-(0-2)	3444	Y	
BARIUM	MG/KG	330	1	30	7720			975	44	44	23	ECH-S-RFI2-S1I-1(0-1.25)	23.4	Y	
BORON	MG/KG	0.5	3	5.5	118			25.8	11	16	11	ECH-S-A13-02S(0-2)	236	Y	
CADMIUM	MG/KG	0.36	1	0.96	1020			125	42	44	42	ECH-S-RFI2-S1I-2(0-1.5)	2833	Y	
CHROMIUM	MG/KG	26	1	1.85	234			29.1	44	44	14	ECH-S-RFI2-S1I-4(0-1)	9.0	Y	
COPPER	MG/KG	5.4	2	1.89	4470			518	44	44	42	ECH-S-RFI2-A13-2(0-2)	828	Y	
CYANIDE	MG/KG	1.33	2	0.97	0.97			0.47	1	5	0	ECH-S-S1C-03S(0-2)	<1	N	
FLUORIDE	MG/KG	NA	--	2.1	92			43.3	5	5	--	ECH-S-S1C-02S(0-2)	--	N	
IRON	MG/KG	200	3	22000	137000			52863	8	8	8	ECH-S-RFI2-A13-2(0-2)	685	N	b
LEAD	MG/KG	11	1	13.4	58300			9443	44	44	44	ECH-S-RFI2-S1J-1(0-2)	5300	Y	
NICKEL	MG/KG	13.6	2	1.1	569			61.1	41	44	32	ECH-S-RFI2-S1B-4(0-1.5)	41.8	Y	
SELENIUM	MG/KG	0.0276	2	1.47	902			142	30	44	30	ECH-S-RFI2-S1A-6(0-1)	32681	Y	
SULFATE	MG/KG	NA	--	413	22600			15383	5	5	--	ECH-S-S1C-02S(0-2)	--	N	b
VANADIUM	MG/KG	1.59	2	0.48	412			55.2	44	44	41	ECH-S-RFI2-S1B-3(0-1)	259	Y	
ZINC	MG/KG	6.62	2	7.88	120000			22555	43	44	43	ECH-E-S1J-01S(0-2)	18127	Y	

1) Aroclor screening value reflects Region V ESL for total PCBs.

2) Sources:

1- USEPA Ecoological Soil Screening Level available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 Values available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22, 2003

3 - Other Values from:

ORNL[1] - Efroymson, R.A, M.E. Will, G.W. Suter and A.C. Wooten. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. ES/ER/TM-85/R3. Prepared for U.S. Department of Energy by Lockheed Martin Systems, Inc., Oak Ridge National Laboratory.

ORNL[2] - Efroymson, R.A, M.E. Will and G.W. Suter. 1997. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. ES/ER/TM-85/R3. Prepared for U.S. Department of Energy by Lockheed Martin Systems, Inc., Oak Ridge National Laboratory.

3) a - Not retained as a contaminant of potential ecological concern (COPEC) because toxicological effects data were not available and other chemicals of similar structure in the same class were not identified as COPECs.

b - Not retained as a COPEC because element is essential for plant growth and generally not considered to be toxic.

c - Not retained as a COPEC for further evaluation because concentrations were below detection limits, compounds of similar structure and in the same class of chemical compounds were retained as COPECS, and any management to address risk from the other compounds will address risk from these compounds.

NA - Screening value not available

Table A-2
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA1
DuPont East Chicago Site
East Chicago, Indiana

Analyte	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ALUMINUM	mg/kg	50	3	13,400	25,400	18700	5	5	5	BERA-S2D-02 (0-1)	508	N	a
ANTIMONY	mg/kg	0.27	1	0.96	2.21	1.6	5	5	5	BERA-S2D-01 (0-1)	8.19	Y	
ARSENIC	mg/kg	18	1	5.4	12.5	8.3	5	5	0	BERA-S2D-01 (0-1)	<1	N	
BARIUM	mg/kg	330	1	91.9	350	271.6	5	5	2	BERA-S2D-02 (1-2)	1.06	N	b
BERYLLIUM	mg/kg	21	1	2.2	9.19	6.18	5	5	0	BERA-S2D-02 (0-1)	<1	N	
CADMIUM	mg/kg	0.36	1	1.93	17.4	7	5	5	5	BERA-S2D-01 (0-1)	48.3	Y	
CHROMIUM	mg/kg	26	1	21.8	39.4	32.2	5	5	4	BERA-S2D-01 (1-2)	1.52	Y	
COBALT	mg/kg	13	1	6.52	22.6	15.52	5	5	3	BERA-S2D-02 (0-1)	1.74	Y	
COPPER	mg/kg	5.4	2	29	115	87	5	5	5	BERA-S2D-02 (0-1)	21.30	Y	
IRON	mg/kg	200	3	26500	77900	45980	5	5	5	BERA-S2D-01 (1-2)	389.50	N	c
LEAD	mg/kg	11	1	40.6	208	113	5	5	5	BERA-S2D-01 (0-1)	18.9	Y	
MANGANESE	mg/kg	100	3	241	485	381	5	5	5	BERA-S2D-01 (0-1)	4.85	Y	
MERCURY	mg/kg	0.1	2	0.0115	0.403	0.17	5	5	3	BERA-S2D-01 (1-2)	4.03	Y	
NICKEL	mg/kg	13.6	2	33.4	106	74.62	5	5	5	BERA-S2D-02 (0-1)	7.79	Y	
SELENIUM	mg/kg	0.0276	2	0.80	4	2.04	5	5	5	BERA-S2D-01 (1-2)	144.93	Y	
SILVER	mg/kg	4.04	2	0.668	1.33	1.0	5	5	0	BERA-S2D-02 (0-1)	<1	N	
THALLIUM	mg/kg	0.0569	2	0.0824	0.4	0.201	5	5	5	BERA-S2D-01 (0-1)	7.03	Y	
VANADIUM	mg/kg	1.59	2	49	77.4	63.06	5	5	5	BERA-S2D-02 (0-1)	48.68	Y	
ZINC	mg/kg	6.62	2	688	3790	2316	5	5	5	BERA-S2D-01 (0-1)	572.51	Y	

1) Sources:
1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005
2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003
3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Notes:
a - Non-toxic at soil pH >5.5.
b - HQ nominally greater than 1.0.
c - Essential element and largely unavailable for biological uptake.

Table A-3
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA2
DuPont East Chicago Site
East Chicago, Indiana

Analyte	Unit	Maximum Detection	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ANTIMONY	mg/kg	21	0.27	1	4	21	6	6	8	6	ECH-S-RFI2-S3-3(0-2)	78.5	Y	
ARSENIC	mg/kg	160	18	1	23.7	160	69.1	8	8	8	ECH-S-RFI2-S3-4(0-2)	8.89	Y	
BARIUM	mg/kg	2650	330	1	145	2650	702	8	8	5	ECH-S-RFI2-S3-4(0-2)	8.03	Y	
BORON	mg/kg	69.3	0.5	3	50.7	69.3	31.8	2	4	2	ECH-S-S3-03S(0-2)	139	Y	
CADMIUM	mg/kg	246	0.36	1	5.67	246	51.6	8	8	8	ECH-S-RFI2-S3-4(0-2)	683	Y	
CHROMIUM	mg/kg	173	26	1	8.76	173	47	8	8	5	ECH-S-S3-01S(0-2)	6.65	Y	
COPPER	mg/kg	1080	5.4	2	85.5	1080	338	8	8	8	ECH-S-RFI2-S3-4(0-2)	200	Y	
IRON	mg/kg	114000	200	3	17300	114000	63825	4	4	4	ECH-S-RFI2-S3-4(0-2)	570	N	a
LEAD	mg/kg	13700	11	1	389	13700	3508	8	8	8	ECH-S-RFI2-S3-4(0-2)	1245	Y	
NICKEL	mg/kg	45.8	13.6	2	8.59	45.8	25	8	8	6	ECH-S-RFI2-S3-4(0-2)	3.4	Y	
SELENIUM	mg/kg	9.9	0.0276	2	0.939	9.9	4	6	8	6	ECH-S-RFI2-S3-1(0-2)	359	Y	
VANADIUM	mg/kg	69.7	1.59	2	11.9	69.7	39	8	8	8	ECH-S-RFI2-S3-2(0-2)	43.8	Y	
ZINC	mg/kg	21900	6.62	2	1210	21900	6278	8	8	8	ECH-S-RFI2-S3-4(0-2)	3308	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Notes:

a - Essential element and largely unavailable for biological uptake.

Table A-4
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA3
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ Using Region V ESLs	COPEC Y/N	Notes
2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	27.2	2	ND	ND	18	23	10.06	0	9	0		<1	N	a
DDT	ug/kg	3.5	2	32.3	2430	0.87	0.87	454.34	8	9	8	A2E-03S	694.3	Y	
DDD	ug/kg	758	2	17.1	158	0.87	16	34.91	3	7	0	A2E-03S	<1	N	
DDE	ug/kg	596	2	11.3	570	0.87	0.87	107.90	8	9	0	A2E-03S	<1	N	
HEXANE	ug/kg	NA	--	ND	ND	6	7	3.250	0	4	--		--	N	
METHOXYCHLOR	ug/kg	19.9	2	4.6	512	4.3	90	85.84	5	8	3	A2E-03S	25.7	Y	
TOLUENE	ug/kg	5450	2	ND	ND	6	7	3.2500	0	4	0		<1	N	
ANTIMONY	mg/kg	0.27	1	1.91	297	0.725	0.726	47.29	5	7	5	ECH-S-RFI2-S4-4(0-2)	1100	Y	
ARSENIC	mg/kg	18	1	37.7	99400			7665.86	16	16	16	S4-02S	5522	Y	
BARIUM	mg/kg	330	1	42	13800			1754.94	16	16	6	S4-02S	42	Y	
CADMIUM	mg/kg	0.36	1	0.979	6.71			3.05	7	7	7	ECH-S-RFI2-S4-4(0-2)	19	Y	
CHROMIUM	mg/kg	26	1	3.71	484			89.54	7	7	4	ECH-S-RFI2-A2E-1(0-2)	19	Y	
COPPER	mg/kg	5.4	2	7.85	3070			503.74	16	16	16	S4-03S	569	Y	
CYANIDE	mg/kg	1.33	2	ND	ND	530	540	266.25	0	4	0		203	Y	
IRON	mg/kg	200	3	6550	127000			57792.86	7	7	7	ECH-S-RFI2-S4-2(0-2)	635	N	b
LEAD	mg/kg	11	1	94.1	89300			13706.82	16	16	16	S4-02S	8118	Y	
NICKEL	mg/kg	13.6	2	2.02	24.4			13.29	7	7	4	ECH-S-RFI2-A2E-1(0-2)	1.8	Y	
SELENIUM	mg/kg	0.0276	2	0.928	43.8			9.93	7	7	7	ECH-S-RFI2-S4-1(0-2)	1587	Y	
VANADIUM	mg/kg	1.59	2	4.47	152			36.92	7	7	7	ECH-S-RFI2-A2E-1(0-2)	95.6	Y	
ZINC	mg/kg	6.62	2	69.7	113000			12087.73	16	16	16	S4-03S	17069	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Notes:

a - Non-toxic at soil pH >5.5.

b - Essential element and largely unavialable for biological uptake

Table A-5
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA4
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
1,1,1-TRICHLOROETHANE	ug/kg	29800	2			6	8	3.3	0	5	0		<1	N	
1,1,2,2-TETRACHLOROETHANE	ug/kg	127	2			6	8	3.3	0	5	0		<1	N	
1,1,2-TRICHLOROETHANE	ug/kg	28600	2			6	8	3.3	0	5	0		<1	N	
1,1-DICHLOROETHANE	ug/kg	20100	2			6	8	3.3	0	5	0		<1	N	
1,1-DICHLOROETHENE	ug/kg	8280	2			6	8	3.3	0	5	0		<1	N	
1,2-DICHLOROETHANE	ug/kg	21200	2			6	8	3.3	0	5	0		<1	N	
1,2-DICHLOROPROPANE	ug/kg	32700	2			6	8	3.3	0	5	0		<1	N	
2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	27.2	2			20	28	11.8	0	5	0		<1	N	
2-HEXANONE	ug/kg	12600	2			12	16	6.8	0	5	0		<1	N	
ACETONE	ug/kg	2500	2	41	50	25	33	33.4	3	5	0	ECH-S-S7-01S(0-2)	<1	N	
BENZENE	ug/kg	255	2			6	8	3.3	0	5	0		<1	N	
BROMOCHLOROMETHANE	ug/kg	NA	--			6	8	3.3	0	5	--		--	N	
BROMODICHLOROMETHANE	ug/kg	540	2			6	8	3.3	0	5	0		<1	N	
BROMOFORM	ug/kg	15900	2			6	8	3.3	0	5	0		<1	N	
CARBON DISULFIDE	ug/kg	94.1	2			6	8	3.3	0	5	0		<1	N	
CARBON TETRACHLORIDE	ug/kg	2980	2			6	8	3.3	0	5	0		<1	N	
CHLOROBENZENE	ug/kg	13100	2			6	8	3.3	0	5	0		<1	N	
DIBROMOCHLOROMETHANE	ug/kg	2050	2			6	8	3.3	0	5	0		<1	N	
CHLOROFORM	ug/kg	1190	2			6	8	3.3	0	5	0		<1	N	
CIS-1,2 DICHLOROETHENE	ug/kg	NA	--			6	8	3.3	0	5	--		--	N	
CIS-1,3-DICHLOROPROPENE	ug/kg	398	2			6	8	3.3	0	5	0		<1	N	
DDT	ug/kg	3.5	2	18.3	185			115.96	5	5	5	ECH-S-S7-01S(0-2)	52.9	Y	
DICHLORODIFLUOROMETHANE	ug/kg	39500	2			6	8	3.3	0	5	0		<1	N	
DDD	ug/kg	758	2	13.6	13.6	5.4	86	15.81	1	4	0	ECH-S-S7-01S(0-2)	<1	N	
DDE	ug/kg	596	2	39.3	49	5.4	86	27.77	2	5	0	ECH-S-S7-01S(0-2)	<1	N	
CHLOROETHANE	ug/kg	NA	--			6	8	3.3	0	5	--		--	N	
ETHYLBENZENE	ug/kg	5160	2			6	8	3.3	0	5	0		<1	N	
HEXANE	ug/kg	NA	--			6	8	3.3	0	5	--		--	N	
METHOXYCHLOR	ug/kg	19.9	2	58	151	27	420	104.3	3	5	3	ECH-S-S7-01S(0-2)	7.59	Y	
METHYL BROMIDE	ug/kg	235	2			6	8	3.3	0	5	0		<1	N	
METHYL CHLORIDE	ug/kg	10400	2	7	7	6	8	4.1	1	5	0	ECH-S-S7-03S(0-2)	<1	N	
METHYL ETHYL KETONE	ug/kg	89600	2			12	16	6.8	0	5	0		<1	N	
METHYL ISOBUTYL KETONE	ug/kg	443000	2			12	16	6.8	0	5	0		<1	N	
METHYLENE CHLORIDE	ug/kg	4050	2			6	8	3.3	0	5	0		<1	N	
STYRENE	ug/kg	4690	2			6	8	3.3	0	5	0		<1	N	
TETRACHLOROETHYLENE	ug/kg	9920	2			6	8	3.3	0	5	0		<1	N	
TOLUENE	ug/kg	5450	2			6	8	3.3	0	5	0		<1	N	
TRANS-1,2-DICHLOROETHENE	ug/kg	784	2			6	8	3.3	0	5	0		<1	N	
TRANS-1,3-DICHLOROPROPENE	ug/kg	398	2			6	8	3.3	0	5	0		<1	N	
TRICHLOROETHENE	ug/kg	12400	2			6	8	3.3	0	5	0		<1	N	
TRICHLOROFLUOROMETHANE	ug/kg	16400	2			6	8	3.3	0	5	0		<1	N	
VINYL CHLORIDE	ug/kg	646	2			6	8	3.3	0	5	0		<1	N	
XYLENES	ug/kg	1000	2			6	8	3.3	0	5	0		<1	N	
ANTIMONY	mg/kg	0.27	1	38.6	1010			546.4	4	4	4	ECH-S-RFI2-S7-2(0-2.5)	3741	Y	
ARSENIC	mg/kg	18	1	84.1	2060			834.57	9	9	9	ECH-S-S7-03S(0-2)	114.4	Y	
BARIUM	mg/kg	330	1	989	11200			3399	9	9	9	ECH-S-S7-01S(0-2)	34	Y	
CADMIUM	mg/kg	0.36	1	38.9	518			293.98	4	4	4	ECH-S-RFI2-S7-4(0-2)	1439	Y	
CHROMIUM	mg/kg	26	1	10.6	39.9			21.48	4	4	1	ECH-S-RFI2-S7-4(0-2)	1.5	Y	
COPPER	mg/kg	5.4	2	155	4840			1740	9	9	9	ECH-S-RFI2-S7-2(0-2.5)	896.3	Y	
CYANIDE	mg/kg	1.33	2	4.8	58			32.32	5	5	5	ECH-S-S7-01S(0-2)	43.6	Y	
IRON	mg/kg	200	3	17200	151000			94150	4	4	4	ECH-S-RFI2-S7-2(0-2.5)	755.00	N	b
LEAD	mg/kg	11	1	6760	138000			55596	9	9	9	ECH-S-RFI2-S7-2(0-2.5)	12545	Y	
NICKEL	mg/kg	13.6	2	8.83	24.7			14.01	4	4	1	ECH-S-RFI2-S7-4(0-2)	1.8	Y	
SELENIUM	mg/kg	0.0276	2	1.66	18.9			12.39	4	4	4	ECH-S-RFI2-S7-4(0-2)	684.8	Y	
VANADIUM	mg/kg	1.59	2	22.7	49			35.55	4	4	4	ECH-S-RFI2-S7-4(0-2)	30.8	Y	
ZINC	mg/kg	6.62	2	5390	130000			70143	9	9	9	ECH-S-S7-01S(0-2)	19637	Y	

1) Sources:
1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005
2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003
3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm
NA - Screening value not available
Notes:
b - Essential element and largely unavialable for biological uptake

Table A-6
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA5
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Region V ESLs Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
1,1,1-TRICHLOROETHANE	ug/kg	29800	2			1	8	1.89	0	9	0		<1	N	
1,1,2,2-TETRACHLOROETHANE	ug/kg	127	2	110	110			13.78	1	9	1	ECH-S-S10D-01S(0-2)	<1	N	
1,1,2-TRICHLOROETHANE	ug/kg	28600	2			1	8	1.89	0	9	0		<1	N	
1,1-DICHLOROETHANE	ug/kg	20100	2			1	8	1.89	0	9	0		<1	N	
1,1-DICHLOROETHENE	ug/kg	8280	2			1	8	1.89	0	9	0		<1	N	
1,2-DICHLOROETHANE	ug/kg	21200	2			1	8	1.89	0	9	0		<1	N	
1,2-DICHLOROPROPANE	ug/kg	32700	2			1	8	1.89	0	9	0		<1	N	
2-HEXANONE	ug/kg	12600	2			3	16	4.11	0	9	0		<1	N	
4-METHYL-2-PENTANONE	ug/kg	443000	2			3	4	1.60	0	5	0		<1	N	
ACETONE	ug/kg	2500	2	12	39			18.50	4	9	0	ECH-S-BERA-A12-02(0-1)	<1	N	
BENZENE	ug/kg	255	2	4	10			4.01	3	9	0	ECH-S-BERA-A12-02(1-2)	<1	N	
BROMOCHLOROMETHANE	ug/kg	NA	--			6	8	3.63	0	4	--		--	N	
BROMODICHLOROMETHANE	ug/kg	540	2			1	8	1.89	0	9	0		<1	N	
BROMOFORM	ug/kg	15900	2			1	8	1.89	0	9	--		<1	N	
CARBON DISULFIDE	ug/kg	94.1	2	1	10			2.89	3	9	0	ECH-S-S10D-01S(0-2)	<1	N	
CARBON TETRACHLORIDE	ug/kg	2980	2	8	8			2.44	1	9	0	ECH-S-S10D-01S(0-2)	<1	N	
CHLOROBENZENE	ug/kg	13100	2			1	8	1.89	0	9	0		<1	N	
CHLOROETHANE	ug/kg	NA	--			2	8	2.17	0	9	--		--	N	
CHLOROFORM	ug/kg	1190	2	1	10			3.39	4	9	0	ECH-S-S10D-01S(0-2)	<1	N	
CIS-1,2 DICHLOROETHENE	ug/kg	NA	--			1	8	1.89	0	9	--		--	N	
CIS-1,3-DICHLOROPROPENE	ug/kg	398	2			1	8	1.89	0	9	0		<1	N	
DIBROMOCHLOROMETHANE	ug/kg	2050	2			1	8	1.89	0	9	0		<1	N	
DICHLORODIFLUOROMETHANE	ug/kg	39500	2			6	8	3.63	0	4	0		<1	N	
ETHYLBENZENE	ug/kg	5160	2			1	8	1.89	0	9	0		<1	N	
HEXANE	ug/kg	NA	--			6	8	3.63	0	4	--		--	N	
METHYL BROMIDE	ug/kg	235	2			2	8	2.17	0	9	0		<1	N	
METHYL CHLORIDE	ug/kg	10400	2			2	8	2.17	0	9	0		<1	N	
METHYL ETHYL KETONE	ug/kg	89600	2			4	16	4.44	0	9	0		<1	N	
METHYL ISOBUTYL KETONE	ug/kg	443000	2			11	16	7.25	0	4	0		<1	N	
METHYLENE CHLORIDE	ug/kg	4050	2			2	8	2.17	0	9	0		<1	N	
STYRENE	ug/kg	4690	2			1	8	1.89	0	9	0		<1	N	
TETRACHLOROETHYLENE	ug/kg	9920	2	1800	1800			201.56	1	9	0	ECH-S-S10D-01S(0-2)	<1	N	
TOLUENE	ug/kg	5450	2	1	1			1.94	1	9	0	ECH-S-BERA-A12-02(0-1)	<1	N	
TRANS-1,2-DICHLOROETHENE	ug/kg	784	2			1	8	1.89	0	9	0		<1	N	
TRANS-1,3-DICHLOROPROPENE	ug/kg	398	2			1	8	1.89	0	9	0		<1	N	
TRICHLOROETHENE	ug/kg	12400	2	1	21			4.61	4	9	0	ECH-S-S10D-01S(0-2)	<1	N	
TRICHLOROFLUOROMETHANE	ug/kg	16400	2	7	9			5.13	1	4	0	ECH-S-S10D-01S(0-2)	<1	N	
VINYL CHLORIDE	ug/kg	646	2			1	8	1.89	0	9	0		<1	N	
XYLENES	ug/kg	1000	2			1	8	1.89	0	9	0		<1	N	
ALUMINUM	mg/kg	50	3	2000	2940			2580.00	6	6	6	ECH-S-BERA-A12-01(0-1)	58.8	N	
ANTIMONY	mg/kg	0.27	1	3.87	7360			756.98	18	18	18	ECH-S-S10D-01S(0-2)	27259	Y	
ARSENIC	mg/kg	18	1	7.69	933			30.85	16	16	13	ECH-S-RFI2-S10A-2(0-1.5)	51.8	Y	
BARIUM	mg/kg	330	1	38.9	670			85.40	14	14	2	ECH-S-RFI2-S10D-1(0-1)	2.0	Y	
BERYLLIUM	mg/kg	21	1	0.215	0.378			0.32	6	6	0	ECH-S-BERA-A12-01(0-1)	<1	N	
CADMIUM	mg/kg	0.36	1	0.076900002	5930			19.17	14	14	13	ECH-S-RFI2-S10D-4(0-2)	16472	Y	
CHROMIUM	mg/kg	26	1	2.8	895			11.24	14	14	4	ECH-S-RFI2-S10A-2(0-1.5)	34	Y	
COBALT	mg/kg	13	1	2.08	3.18			2.51	6	6	0	ECH-S-BERA-A12-02(0-1)	<1	N	
COPPER	mg/kg	5.4	2	2.4	5100			53.28	14	14	13	ECH-S-RFI2-S10D-4(0-2)	944.4	Y	
IRON	mg/kg	200	3	5070	12500			9008.33	6	6	6	ECH-S-BERA-A12-01(0-1)	62.50	N	b
LEAD	mg/kg	11	1	90.6	144000			615.17	14	14	14	ECH-S-RFI2-S10D-4(0-2)	13091	Y	
MANGANESE	mg/kg	100	3	76.8	314			132.65	6	6	3	ECH-S-BERA-A12-01(0-1)	3.14	Y	
MERCURY	mg/kg	0.1	2	0.569	1.21			0.80	6	6	6	ECH-S-BERA-A12-01(0-1)	12.1	Y	
NICKEL	mg/kg	13.6	2	0.343	16.8			6.80	14	14	2	ECH-S-RFI2-S10D-1(0-1)	1.2	Y	
SELENIUM	mg/kg	0.0276	2	0.649	239			1.40	14	14	14	ECH-S-RFI2-S10D-4(0-2)	8659	Y	
SILVER	mg/kg	4.04	2	1.63	2.35			1.93	6	6	0	ECH-S-BERA-A12-02(1-2)	<1	N	
THALLIUM	mg/kg	0.0569	2	0.132	0.233			0.20	6	6	6	ECH-S-BERA-A12-02(0-1)	4.09	Y	
VANADIUM	mg/kg	1.59	2	1.98	20.2			6.82	14	14	14	ECH-S-RFI2-S10A-2(0-1.5)	12.7	Y	
ZINC	mg/kg	6.62	2	11.3	120000			1743.33	14	14	14	ECH-S-RFI2-S10D-4(0-2)	18127	Y	

1) Sources:
1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005
2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003
3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm
NA - Screening value not available
Notes:
b - Essential element and largely unavialable for biological uptake

Table A-7
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA6
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Units	Maximum Detection	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ALUMINUM	mg/kg	3250	50	3	1850	3250			2550	2	2	2	BERA-S10B-01(0-1)	65	N	
ANTIMONY	mg/kg	120	0.27	1	5.14	120	3.4	4.2	30.45	6	8	6	BERA-S10B-01(1-2)	444	Y	
ARSENIC	mg/kg	255	18	1	4.12	255			58.36	8	8	2	BERA-S10B-01(1-2)	14.2	Y	
BARIUM	mg/kg	54.3	330	1	44.6	54.3			49.45	2	2	0	BERA-S10B-01(0-1)	<1	N	
BERYLLIUM	mg/kg	0.384	21	1	0.212	0.384			0.298	2	2	0	BERA-S10B-01(0-1)	<1	N	
CADMIUM	mg/kg	671	0.36	1	310	671			490.5	2	2	2	BERA-S10B-01(1-2)	1864	Y	
CHROMIUM	mg/kg	5.98	26	1	3.35	5.98			4.665	2	2	0	BERA-S10B-01(0-1)	<1	N	
COBALT	mg/kg	2.35	13	1	0.529	2.35			1.4395	2	2	0	BERA-S10B-01(0-1)	<1	N	
COPPER	mg/kg	113	5.4	2	80.3	113			96.65	2	2	2	BERA-S10B-01(0-1)	20.93	Y	
IRON	mg/kg	9020	200	3	7540	9020			8280	2	2	2	BERA-S10B-01(1-2)	45.1	N	
LEAD	mg/kg	147000	11	1	140000	147000			143500	2	2	2	BERA-S10B-01(0-1)	13364	Y	
MANGANESE	mg/kg	368	100	3	194	368			281	2	2	2	BERA-S10B-01(0-1)	3.68	Y	
MERCURY	mg/kg	52.1	0.1	2	25.8	52.1			38.95	2	2	2	BERA-S10B-01(1-2)	521	Y	
NICKEL	mg/kg	5.12	13.6	2	2.94	5.12			4.03	2	2	0	BERA-S10B-01(0-1)	<1	Y	
SELENIUM	mg/kg	13.4	0.0276	2	9.96	13.4			11.68	2	2	2	BERA-S10B-01(1-2)	486	Y	
SILVER	mg/kg	100	4.04	2	58.9	100			79.45	2	2	2	BERA-S10B-01(1-2)	24.8	Y	
THALLIUM	mg/kg	0.881	0.0569	2	0.646	0.881			0.7635	2	2	2	BERA-S10B-01(1-2)	15.5	Y	
VANADIUM	mg/kg	5.75	1.59	2	3.72	5.75			4.74	2	2	2	BERA-S10B-01(0-1)	3.62	Y	
ZINC	mg/kg	4100	6.62	2	1150	4100			2625	2	2	2	BERA-S10B-01(0-1)	619	Y	
1,1,1-TRICHLOROETHANE	ug/kg		29800	2			6	6	3	0	4	0		<1	N	
1,1,2,2-TETRACHLOROETHANE	ug/kg		127	2			6	6	3	0	4	0		<1	N	
1,1,2-TRICHLOROETHANE	ug/kg		28600	2			6	6	3	0	4	0		<1	N	
1,1-DICHLOROETHANE	ug/kg		20100	2			6	6	3	0	4	0		<1	N	
1,1-DICHLOROETHENE	ug/kg		8280	2			6	6	3	0	4	0		<1	N	
1,2-DICHLOROETHANE	ug/kg		21200	2			6	6	3	0	4	0		<1	N	
1,2-DICHLOROPROPANE	ug/kg		32700	2			6	6	3	0	4	0		<1	N	
2-HEXANONE	ug/kg		12600	2			11	13	6	0	4	0		<1	N	
ACETONE	ug/kg		2500	2			22	26	12	0	4	0		<1	N	
BENZENE	ug/kg		255	2			6	6	3	0	4	0		<1	N	
BROMOCHLOROMETHANE	ug/kg		NA	--			6	6	3	0	4	--		--	N	
BROMODICHLOROMETHANE	ug/kg		540	2			6	6	3	0	4	0		<1	N	
BROMOFORM	ug/kg		15900	2			6	6	3	0	4	0		<1	N	
CARBON DISULFIDE	ug/kg		94.1	2			6	6	3	0	4	0		<1	N	
CARBON TETRACHLORIDE	ug/kg		2980	2			6	6	3	0	4	0		<1	N	
CHLOROBENZENE	ug/kg		13100	2			6	6	3	0	4	0		<1	N	
DIBROMOCHLOROMETHANE	ug/kg		2050	2			6	6	3	0	4	0		<1	N	
CHLOROFORM	ug/kg		1190	2			6	6	3	0	4	0		<1	N	
CIS-1,2 DICHLOROETHENE	ug/kg		NA	--			6	6	3	0	4	--		--	N	
CIS-1,3-DICHLOROPROPENE	ug/kg		398	2			6	6	3.00	0	4	0		<1	N	
DICHLORODIFLUOROMETHANE	ug/kg		39500	2			6	6	3	0	4	0		<1	N	
CHLOROETHANE	ug/kg		NA	--			6	6	3	0	4	0		--	N	
ETHYLBENZENE	ug/kg		5160	2			6	6	3	0	4	0		<1	N	
HEXANE	ug/kg		NA	--			6	6	3	0	4	--		--	N	
METHYL BROMIDE	ug/kg		235	2			6	6	3	0	4	0		<1	N	
METHYL CHLORIDE	ug/kg		10400	2			6	6	3	0	4	0		<1	N	
METHYL ETHYL KETONE	ug/kg		89600	2			11	13	6	0	4	0		<1	N	
METHYL ISOBUTYL KETONE	ug/kg		443000	2			11	13	6	0	4	0		<1	N	
METHYLENE CHLORIDE	ug/kg		4050	2			6	6	3	0	4	0		<1	N	
STYRENE	ug/kg		4690	2			6	6	3	0	4	0		<1	N	
SULFATE	mg/kg	626	NA	--	40	626	22	22	183	3	4	--	ECH-S-S10C-02U(0.25-1.75)	--	N	
TETRACHLOROETHYLENE	ug/kg	21	9920	2	21	21	6	6	7.5	1	4	0	ECH-S-S10C-02U(0.25-1.75)	<1	N	
TOLUENE	ug/kg		5450	2			6	6	3	0	4	0		<1	N	
TRANS-1,2-DICHLOROETHENE	ug/kg		784	2			6	6	3	0	4	0		<1	N	
TRANS-1,3-DICHLOROPROPENE	ug/kg		398	2			6	6	3	0	4	0		<1	N	
TRICHLOROETHENE	ug/kg		12400	2			6	6	3	0	4	0		<1	N	
TRICHLOROFLUOROMETHANE	ug/kg	7	16400	2	7	7	6	6	4	1	4	0	ECH-S-S10C-02U(0.25-1.75)	<1	N	
VINYL CHLORIDE	ug/kg		646	2			6	6	3	0	4	0		<1	N	
XYLENES	ug/kg		1000	2			6	6	3	0	4	0		<1	N	

1) Sources:
1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005
2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003
3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm
NA - Screening value not available

Table A-8
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA7
DuPont East Chicago Site

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ANTIMONY	mg/kg	0.27	1	1.2	1.2	1.2	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	4.4	Y	
ARSENIC	mg/kg	18	1	9.05	9.05	9.05	1	1	0	ECH-S-RFI2-S2C-1(0-1.5)	<1	N	
BARIUM	mg/kg	330	1	162	162	162	1	1	0	ECH-S-RFI2-S2C-1(0-1.5)	<1	N	
CADMIUM	mg/kg	0.36	1	3.09	3.09	3.09	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	9	Y	
CHROMIUM	mg/kg	26	1	12.8	12.8	12.8	1	1	0	ECH-S-RFI2-S2C-1(0-1.5)	<1	N	
COPPER	mg/kg	5.4	2	23.2	23.2	23.2	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	4.3	Y	
LEAD	mg/kg	11	1	176	176	176	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	16	Y	
NICKEL	mg/kg	13.6	2	22.5	22.5	22.5	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	1.7	Y	
SELENIUM	mg/kg	0.0276	2	4.18	4.18	4.18	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	151	Y	
VANADIUM	mg/kg	1.59	2	18.6	18.6	18.6	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	11.7	Y	
ZINC	mg/kg	6.62	2	327	327	327	1	1	1	ECH-S-RFI2-S2C-1(0-1.5)	49.4	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Table A-9
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA8
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
AMMONIA	mg/kg	NA	--	ND	ND	59.4	59.5	29.73	0	2	--		--	N	
ANTIMONY	mg/kg	0.27	1	1.61	1.77			110.91	3	4	3	ECH-S-RFI2-S8-4(0-1.5)	6.6	Y	
ARSENIC	mg/kg	18	1	13.5	46			30.1	4	4	3	ECH-S-RFI2-S8-3(0-1)	2.56	Y	
BARIUM	mg/kg	330	1	95	1080			401.75	4	4	1	ECH-S-RFI2-S8-1(0-1.25)	3	Y	
CADMIUM	mg/kg	0.36	1	1.43	97.6			40.36	4	4	4	ECH-S-RFI2-S8-4(0-1.5)	271	Y	
CHROMIUM	mg/kg	26	1	16.2	45.4			30.43	4	4	2	ECH-S-RFI2-S8-2(0-1)	1.7	Y	
COPPER	mg/kg	5.4	2	35	1040			393.75	4	4	4	ECH-S-RFI2-S8-4(0-1.5)	192.6	Y	
LEAD	mg/kg	11	1	47.7	1290			653.93	4	4	4	ECH-S-RFI2-S8-4(0-1.5)	117	Y	
NICKEL	mg/kg	13.6	2	10.3	26.5			18.35	4	4	3	ECH-S-RFI2-S8-2(0-1)	1.9	Y	
SELENIUM	mg/kg	0.0276	2	1.92	4.19			3.07	4	4	4	ECH-S-RFI2-S8-4(0-1.5)	151.8	Y	
VANADIUM	mg/kg	1.59	2	12.5	49.1			23.43	4	4	4	ECH-S-RFI2-S8-1(0-1.25)	30.9	Y	
ZINC	mg/kg	6.62	2	248	24900			10467	4	4	4	ECH-S-RFI2-S8-4(0-1.5)	3761	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Table A-10
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA9
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Units	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ANTIMONY	mg/kg	0.27	1	4	16.2			8.72	5	5	5	BERA-S14-02(0-1)	60	Y	
ARSENIC	mg/kg	18	1	49	2770			1102.64	5	5	5	BERA-S14-01(0-1)	154	Y	
CADMIUM	mg/kg	0.36	1	22.2	42.2			28.1	5	5	5	ECH-S-S14-03U(0-2)	117	Y	
CHROMIUM	mg/kg	26	1	4.35	28.5			17.55	5	5	2	BERA-S14-01(0-1)	1.1	N	c
ZINC	mg/kg	6.62	2	2910	10100			4706	5	5	5	ECH-S-S14-03U(0-2)	1526	Y	
1,1,1-TRICHLOROETHANE	ug/kg	29800	2			6	7	3.25	0	2	0		<1	N	
1,1,2,2-TETRACHLOROETHANE	ug/kg	127	2			6	7	3.25	0	2	0		<1	N	
1,1,2-TRICHLOROETHANE	ug/kg	28600	2			6	7	3.25	0	2	0		<1	N	
1,1-DICHLOROETHANE	ug/kg	20100	2			6	7	3.25	0	2	0		<1	N	
1,1-DICHLOROETHENE	ug/kg	8280	2			6	7	3.25	0	2	0		<1	N	
1,2-DICHLOROETHANE	ug/kg	21200	2			6	7	3.25	0	2	0		<1	N	
1,2-DICHLOROPROPANE	ug/kg	32700	2			6	7	3.25	0	2	0		<1	N	
2-HEXANONE	ug/kg	12600	2			13	13	6.5	0	2	0		<1	N	
ACETONE	ug/kg	2500	2	26	26	27	27	19.75	1	2	0	ECH-S-S14-03U(0-2)	<1	N	
BENZENE	ug/kg	255	2	7	7	6	6	5	1	2	0	ECH-S-S14-02U(1-3)	<1	N	
BROMOCHLOROMETHANE	ug/kg	NA	--			6	7	3.25	0	2	--		--	N	
BROMODICHLOROMETHANE	ug/kg	540	2			6	7	3.25	0	2	0		<1	N	
BROMOFORM	ug/kg	15900	2			6	7	3.25	0	2	0		<1	N	
CARBON DISULFIDE	ug/kg	94.1	2	42	42	7	7	22.75	1	2	0	ECH-S-S14-03U(0-2)	<1	N	
CARBON TETRACHLORIDE	ug/kg	2980	2			6	7	3.25	0	2	0		<1	N	
CHLOROBENZENE	ug/kg	13100	2			6	7	3.25	0	2	0		<1	N	
DIBROMOCHLOROMETHANE	ug/kg	2050	2			6	7	3.25	0	2	0		<1	N	
CHLOROFORM	ug/kg	1190	2			6	7	3.25	0	2	0		<1	N	
CIS-1,2 DICHLOROETHENE	ug/kg	NA	--			6	7	3.25	0	2	--		--	N	
CIS-1,3-DICHLOROPROPENE	ug/kg	398	2			6	7	3.25	0	2	0		<1	N	
DICHLORODIFLUOROMETHANE	ug/kg	39500	2			6	7	3.25	0	2	0		<1	N	
CHLOROETHANE	ug/kg	NA	--			6	7	3.25	0	2	--		--	N	
ETHYLBENZENE	ug/kg	5160	2			6	7	3.25	0	2	0		<1	N	
HEXANE	ug/kg	NA	--			6	7	3.25	0	2	--		--	N	
METHYL BROMIDE	ug/kg	235	2			6	7	3.25	0	2	0		<1	N	
METHYL CHLORIDE	ug/kg	10400	2			6	7	3.25	0	2	0		<1	N	
METHYL ETHYL KETONE	ug/kg	89600	2			13	13	6.5	0	2	0		<1	N	
METHYL ISOBUTYL KETONE	ug/kg	443000	2			13	13	6.5	0	2	0		<1	N	
METHYLENE CHLORIDE	ug/kg	4050	2			6	7	3.25	0	2	0		<1	N	
STYRENE	ug/kg	4690	2			6	7	3.25	0	2	0		<1	N	
SULFATE	mg/kg	NA	--	16800	16800			19000	2	2	--	ECH-S-S14-02U(1-3)	--	N	
TETRACHLOROETHYLENE	ug/kg	9920	2			6	7	3.25	0	2	0		<1	N	
TOLUENE	ug/kg	5450	2			6	7	3.25	0	2	0		<1	N	
TRANS-1,2-DICHLOROETHENE	ug/kg	784	2			6	7	3.25	0	2	0		<1	N	
TRANS-1,3-DICHLOROPROPENE	ug/kg	398	2			6	7	3.25	0	2	0		<1	N	
TRICHLOROETHENE	ug/kg	12400	2			6	7	3.25	0	2	0		<1	N	
TRICHLOROFLUOROMETHANE	ug/kg	16400	2			6	7	3.25	0	2	0		<1	N	
VINYL CHLORIDE	ug/kg	646	2			6	7	3.25	0	2	0		<1	N	
XYLENES	ug/kg	1000	2			6	7	3	0	2	0		<1	N	

1) Sources:
1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005
2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003
3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm
NA - Screening value not available
Notes:
c - Eliminated as COPEC because maximum detected concentrations only exceeded the screening benchmark marginally and at two sample locations

Table A-11
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA10
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screning Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of USEPA Eco SSL Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ANTIMONY	mg/kg	0.27	1	5.97	92.2	30.3	4	4	4	ECH-S-RFI2-S21-2(0-2)	341	Y	
ARSENIC	mg/kg	18	1	8	237	118	4	4	3	ECH-S-RFI2-S21-3(0-2)	13.2	Y	
BARIUM	mg/kg	330	1	10.2	539	345	4	4	3	ECH-S-RFI2-S21-3(0-2)	1.6	Y	
CADMIUM	mg/kg	0.36	1	2.97	21.9	8.51	4	4	4	ECH-S-RFI2-S21-2(0-2)	61	Y	
CHROMIUM	mg/kg	26	1	5.14	22.1	11.7	4	4	0	ECH-S-RFI2-S21-2(0-2)	<1	N	
COPPER	mg/kg	5.4	2	14.8	414	240	4	4	4	ECH-S-RFI2-S21-2(0-2)	76.7	Y	
IRON	mg/kg	200	3	505	211000	136876	4	4	4	ECH-S-RFI2-S21-3(0-2)	1055	N	a
LEAD	mg/kg	11	1	156	4500	2154	4	4	4	ECH-S-RFI2-S21-2(0-2)	409	Y	
NICKEL	mg/kg	13.6	2	0.694	122	57.0	4	4	2	ECH-S-RFI2-S21-2(0-2)	9.0	Y	
SELENIUM	mg/kg	0.0276	2	1.69	18.8	9.42	4	4	4	ECH-S-RFI2-S21-4(0-2)	681	Y	
SULFATE	mg/kg	NA	--	867	4250	2559	2	2	--	BERA-A1C-01(1-2)	--	N	
VANADIUM	mg/kg	1.59	2	0.524	39.3	21.9	4	4	3	ECH-S-RFI2-S21-3(0-2)	24.7	Y	
ZINC	mg/kg	6.62	2	47.3	7520	2124	4	4	4	ECH-S-RFI2-S21-2(0-2)	1136	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Notes:

a - Essential element and largely unavailable for biological uptake.

Table A-12
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA12
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ANTIMONY	mg/kg	0.27	1	6.88	30.8	18.84	2	2	2	ECH-S-RFI2-S12B-2(0-1.25)	114.1	Y	
ARSENIC	mg/kg	18	1	11.5	33.9	22.7	2	2	1	ECH-S-RFI2-S12B-2(0-1.25)	1.88	Y	
BARIUM	mg/kg	330	1	297	369	333	2	2	1	ECH-S-RFI2-S12B-1(0-1)	1.1	Y	
CADMIUM	mg/kg	0.36	1	5.37	7.36	6.365	2	2	2	ECH-S-RFI2-S12B-1(0-1)	20	Y	
CHROMIUM	mg/kg	26	1	15.8	174	94.9	2	2	1	ECH-S-RFI2-S12B-2(0-1.25)	7	Y	
COPPER	mg/kg	5.4	2	40.5	1180	610.25	2	2	2	ECH-S-RFI2-S12B-2(0-1.25)	218.5	Y	
LEAD	mg/kg	11	1	216	335	275.5	2	2	2	ECH-S-RFI2-S12B-2(0-1.25)	30	Y	
NICKEL	mg/kg	13.6	2	4.6	31.4	18	2	2	1	ECH-S-RFI2-S12B-2(0-1.25)	2.3	Y	
SELENIUM	mg/kg	0.0276	2	1.31	1.99	1.65	2	2	2	ECH-S-RFI2-S12B-2(0-1.25)	72.1	Y	
VANADIUM	mg/kg	1.59	2	7.41	8.02	7.715	2	2	2	ECH-S-RFI2-S12B-2(0-1.25)	5.04	Y	
ZINC	mg/kg	6.62	2	965	1630	1297.5	2	2	2	ECH-S-RFI2-S12B-2(0-1.25)	246.2	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Table A-13
Results of the Screen to Refine Constitutents of Ecological Concern
for the Baseline Ecological Risk Assessment
Re-Development Area EEA13
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Unit	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ	COPEC Y/N	Notes
ALUMINUM	mg/kg	50	3	1220	9340	4277	7	7	7	BERA-A6-01	187	N	a
ANTIMONY	mg/kg	0.27	1	5.36	48.3	20.9	7	7	7	BERA-A6-02	179	Y	
ARSENIC	mg/kg	18	1	62.3	307	151	7	7	7	BERA-A6-03	17.1	Y	
BARIUM	mg/kg	330	1	111	13900	5782	7	7	5	BERA-A6-02	42	Y	
BERYLLIUM	mg/kg	21	1	0.649	0.88	0.5	5	7	0	BERA-A6-01	<1	N	
CADMIUM	mg/kg	0.36	1	0.878	67.8	25.8	7	7	7	BERA-A6-02	188	Y	
CHROMIUM	mg/kg	26	1	3.85	454	79.6	7	7	2	BERA-A6-02	17.5	Y	
COBALT	mg/kg	13	1	0.298	3.6	2.1	7	7	0	BERA-A6-03	<1	N	
COPPER	mg/kg	5.4	2	22.1	595	217	7	7	7	BERA-A6-02	110	Y	
IRON	mg/kg	200	3	12600	55100	32357	7	7	7	BERA-A6-03	276	N	b
LEAD	mg/kg	11	1	792	16200	6904	7	7	7	BERA-A6-02	1473	Y	
MANGANESE	mg/kg	100	3	23.6	357	136	7	7	5	BERA-A6-01	3.57	Y	
MERCURY	mg/kg	0.1	2	1.27	22.8	7.9	7	7	7	BERA-A6-03	228	Y	
NICKEL	mg/kg	13.6	2	2.85	35.6	18.0	7	7	5	BERA-A6-01	2.6	Y	
SELENIUM	mg/kg	0.0276	2	2.04	29.1	8.9	7	7	7	BERA-A6-03	1054	Y	
SILVER	mg/kg	4.04	2	1.18	14.5	4.2	5	7	3	BERA-A6-02	3.59	Y	
THALLIUM	mg/kg	0.0569	2	0.429	7.21	2.7	7	7	7	BERA-A6-03	127	Y	
VANADIUM	mg/kg	1.59	2	7.3	17	12.8	7	7	7	BERA-A6-01	10.7	Y	
ZINC	mg/kg	6.62	2	178	129000	26419	7	7	7	BERA-A6-01	19486	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Notes:

a - Non-toxic at soil pH >5.5.

b - Essential element and largely unavailable for biological uptake.

Table A-14
Results of theScreen to Refine Constituents of Ecological Concern
for the Baseline Ecological Risk Assessment
Natural Area
DuPont East Chicago Site
East Chicago, Indiana

Parameter	Units	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedences	Location of Detection Max	HQ	COPEC Y/N	Notes
ALUMINUM	mg/kg	50	3	374	9,660	2417	24	24	24	BERA-RNOF05-01(1-2)	193	N	a
ANTIMONY	mg/kg	0.27	1	0.21	400	41.0	36	37	34	BERA-RNOF05-02(1-2)	1481	Y	
ARSENIC	mg/kg	18	1	1.19	433	40.1	36	37	15	BERA-RNOF05-01	24.1	Y	
BARIUM	mg/kg	330	1	3.15	390	74.7	24	24	1	BERA-RNOF05-01(1-2)	1.2	Y	
BERYLLIUM	mg/kg	21	1	0.0585	1.99	0.31	31	37	0	BERA-RNOF01-01	<1	N	
CADMIUM	mg/kg	0.36	1	0.19	3660	167	37	37	34	BERA-RNOF05-01	10167	Y	
CHROMIUM	mg/kg	26	1	2.1	42.3	13.0	36	37	7	BERA-RNOF05-01	1.6	Y	
COBALT	mg/kg	13	1	0.445	50.8	4.86	23	24	2	BERA-RNOF05-01	3.9	Y	
COPPER	mg/kg	5.4	2	1.16	4470	265	37	37	29	BERA-RNOF05-01	828	Y	
IRON	mg/kg	200	3	978	238000	19512	24	24	24	BERA-RNOF05-01	1190	N	b
LEAD	mg/kg	11	1	2.07	124000	5267	37	37	32	BERA-RNOF05-01	11273	Y	
MANGANESE	mg/kg	100	3	8.51	5690	376	24	24	6	BERA-RNOF05-01	56.9	Y	
MERCURY	mg/kg	0.1	2	0.0086	147	8.70	35	37	30	BERA-RNOF05-01	1470	Y	
NICKEL	mg/kg	13.6	2	0.92	26.7	7.05	37	37	4	BERA-RNOF01-01	2.0	Y	
SELENIUM	mg/kg	0.0276	2	0.48	86.3	7.57	31	37	31	BERA-RNOF05-01	3127	Y	
SILVER	mg/kg	4.04	2	0.38	405	17.2	25	37	11	BERA-RNOF05-01	100	Y	
THALLIUM	mg/kg	0.0569	2	0.0172	3.09	0.485	24	37	15	BERA-RNOF06-01(1-2)	54.3	Y	
VANADIUM	mg/kg	1.59	2	3.03	29.8	8.63	23	24	20	BERA-RNOF05-01	18.7	Y	
ZINC	mg/kg	6.62	2	51.9	105000	6537	37	37	36	BERA-RNOF05-01	15861	Y	

1) Sources:

1- USEPA Ecological Soil Screening Level (Eco-SSL) available at http://www.epa.gov/ecotox/ecossl/index.html, updated March 15, 2005

2 - USEPA Region 5 screening value available at http://www.epa.gov/reg5rcra/ca/ESL.pdf, updated August 22,2003

3 - USEPA Region IV screening value availabel at http://www.epa.gov/region4/waste/ots/ecolbul.htm

NA - Screening value not available

Notes:

a - Non-toxic at soil pH >5.5.

b - Essential element and largely unavailable for biological uptake.

APPENDIX B
Toxicity Profiles for Constituents of Potential Ecological Concern

Appendix B
Toxicity Profiles for Constituents of Potential Ecological Concern

Eighteen inorganic chemicals have been identified as contaminants of potential ecological concern (COPECs) at the DuPont East Chicago Site: antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, zinc and cyanide. Four organic chemicals have been identified as COPECs: DDT, methoxychlor and aroclors 1254 and 1260. Toxicity profiles have been prepared for select COPECs based on screening level risk estimates and bioaccumulative potential. These profiles are provided to identify potential ecological effects on receptors at the Site.

Antimony

Antimony is a silvery white metal of medium hardness and low solubility in water. Metallic antimony is stable under ordinary conditions and is not readily altered by air or water. Antimony displays four oxidation states, Sb(-3), Sb(0), Sb(+3), and Sb(+5); the +3 state is the most common and stable (ATSDR 1991). Very little antimony occurs free in nature, and most is derived from stibnite (Sb_2S_3), which contains 71 to 75 percent of this element when nearly pure. Mean antimony concentration in the earth's crust has been estimated to be 0.2 ppm (NAS 1980). Antimony can be released from volcanic eruptions, sea spray, and forest fires. The majority of antimony released to the environment arises from anthropogenic sources including nonferrous metal mining, smelting and refining; the production, use and disposal of antimony alloys and compounds; coal combustion; and refuse and sludge combustion.

Fate and Transport

The speciation and physicochemical state of antimony are important to its behavior in the environment and availability to biota. Antimony that is incorporated into mineral lattices is inert and not bioavailable; however, most analytical methods for antimony do not distinguish between this form and adsorbed forms. Mobility of antimony released to the soil is determined by the nature of the soil, the form of antimony deposited, and the pH of the soil. Antimony sorbs strongly to soil and sediment; its sorption is primarily correlated with the content of iron, aluminum and manganese in the soil with which it coprecipitates as hydroxylated oxides (ATSDR 1991, Lintschinger et al. 1998). Trivalent antimony sorbs to soil more strongly than the pentavalent form (Lintschiner et al. 1998). Since antimony generally has an anionic character, it is expected to have little affinity for organic carbon. Cationic exchange, which generally dominates adsorption to clay, is also not expected to be important for anionic antimony (HSDB 1999). Antimony's general lack of mobility in soil is shown by its distribution in depth profiles at contaminated sites; its concentration is highest in the surface soil layer (Ainsworth et al. 1990). Leaching of antimony increases markedly at low and high pH (HSDB 1999).

Antimony is transported into aquatic systems via natural weathering of soil and from anthropogenic sources. Antimony released to water will generally end up in sediment where it is associated with iron, manganese and aluminum hydroxyoxides. Antimony in aerobic water mostly occurs as Sb(V), although small amounts of Sb(III) are present. Trivalent antimony is the dominant form present in anaerobic water. Antimony can be

reduced and methylated by microorganisms in anaerobic sediment, thereby mobilizing the antimony (ATSDR 1991). Methylated antimony compounds are soluble and readily oxidized (HSDB 1999).

Ecological Effects

Antimony does not appear to bioconcentrate appreciably in fish or other aquatic organisms (U.S. EPA 1979). Body burden analyses of terrestrial organisms suggest that biomagnification of antimony does not occur from lower to higher trophic levels (Ainsworth et al. 1990, Ainsworth et al. 1991, ATSDR 1991). Antimony is sparingly absorbed following ingestion or inhalation, and dermal absorbtion is very low (Felicetti et al. 1974, Gerber et al. 1982). Much of the antimony occurring in plants has been found to be a result of surface deposition. Uptake of antimony from soil by plants is reported to be minor and is dependant on the solubility of antimony in the soil (Ainsworth et al 1990).

The majority of effects resulting from the inhalation of antimony is attributed to the accumulation of antimony dust in the lung (pneumoconiosis) which may progress to a proliferation of alveolar macrophages to fibrosis. The heart is another target organ in antimony exposure, resulting in altered blood pressure, increased heart rate, and decreased contractile force. Antimony is known historically for its emetic properties, causing vomiting, diarrhea, gastric discomfort, and ulcers. Dietary exposure studies have reported decreased hemoglobin and hematocrit levels, altered erythrocyte counts, and swelling of the hepatic cords (ATSDR 1991).

Mammals

The primary exposure route for mammals to antimony is likely to be through incidental ingestion of contaminated soil and consumption of contaminated prey. Dietary exposure studies have demonstrated minor changes in hematology and urine biochemistry (Hext et al. 1999) and elevated concentrations of antimony in liver, lung and kidney tissue (Ainsworth et al. 1991). However, an equilibrium between uptake and excretion of antimony was rapidly established, and progressive increases in organ concentration as exposure duration increased were not observed (Ainsworth et al. 1991). In some studies, dietary exposure resulted in significantly higher liver weights and significantly lower heart weights; however, heart and liver function were not measured (Hiraoka 1986). Exposure to water soluble antimony in chronic exposures increased the frequency of chromosomal aberrations (Gumani et al 1992), significantly reduced lifespan (Schroeder et al. 1968, 1970) and resulted in abnormal serum cholesterol (Schroeder et al. 1970).

Appendix B
Toxicity Profiles for Constituents of Potential Ecological Concern

Arsenic

Arsenic is a naturally occurring component of bedrock and soils and naturally occurring arsenic, in certain geological formations, has been shown to cause adverse health effects. The toxicity of inorganic arsenic (As) depends to a limited extent on its valence state (-3, +3, or +5), and also on the physical and chemical properties of the matrix in which it occurs. Trivalent (As^{+3}) compounds are generally more toxic than pentavalent (As^{+5}) compounds, and the more water-soluble compounds are usually more toxic and more likely to have systemic effects than the less soluble compounds. Arsenic, in mono-methyl and di-methylated forms, is commonly used as an herbicide.

Fate and Transport

Arsenic salts are readily water-soluble and may leach into groundwater and be carried to surface waters. However, under anaerobic conditions such as are found in lake bottoms or buried sediments, arsenic may combine with iron and sulfide to form arsenopyrite, which is much less soluble.

Ecological Effects

Terrestrial Plants and Soil Invertebrates

Plants may acquire arsenic by direct contact with contaminated pore-water and soil invertebrates may acquire arsenic from the soil pore-water of through the diet. Mushrooms, and other plants, as well as ants, metabolize arsenic to from both pore-water and the diet. Plants may accumulate arsenic to high levels, but, at least in some species, over 50% of the total arsenic present is not extractable and could be incorporated into lipids or cell wall components including cellulose, calcium or magnesium pectinates, or lignin.

Concentrations of arsenic in earthworms are always lower than that in the soil and earthworms do not accumulate arsenic. Arsenous acid and arsenic acid are the major species found in earthworms and arsenobetaine is a minor component.

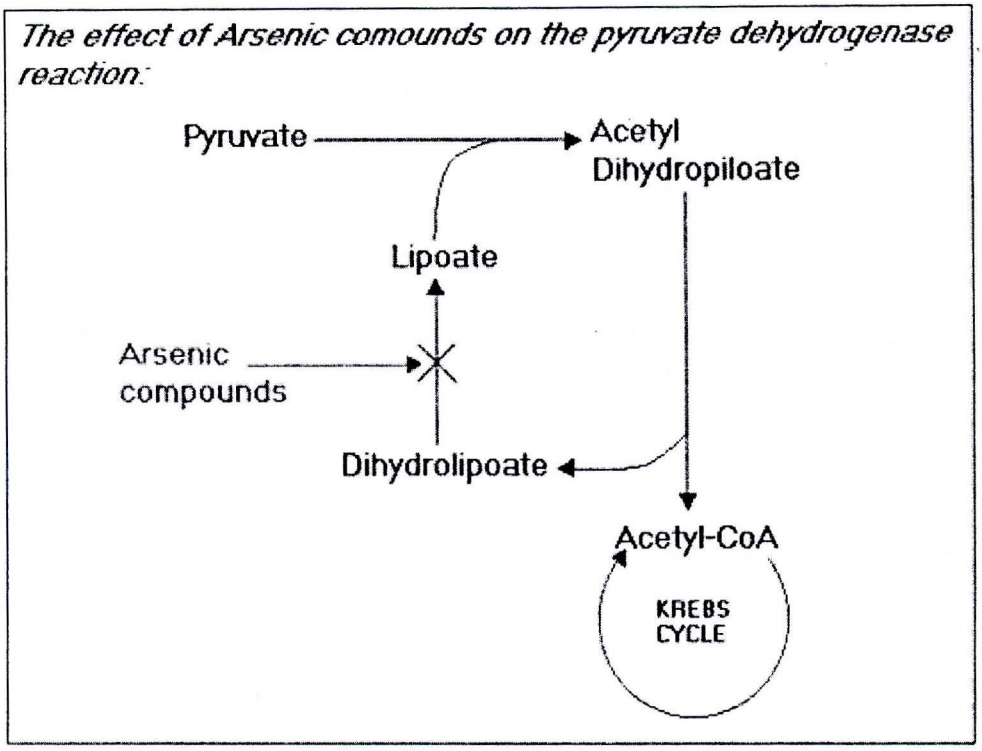
Aquatic Invertebrates and Fish

In fish and invertebrates, arsenic is acquired by organisms from the water column and from the diet. Phytoplankton obtain arsenic from the water column and detoxify it by methylating it to form monoarsonic acid and dimethyarsinic acid. Zooplankton and fish obtain arsenic from both the water column and the diet. Fish and invertebrates further detoxify arsenic by creating arsenic sugars (arsenoribosides), arsenocholine, and arsenobetaine. Fish may accumulate arsenic to high levels, but in the non-toxic form of arsenobetaine. Arsenobetaine levels are higher in planktivorous than in omnivorous or piscivorous fish species.

Birds and Mammals

Arsenic is a mettaloid that often acts differently from metals in that it usually forms oxyanions (AsO_4^-) rather than cations (i.e., Zn^{2+}). The mechanism of arsenic toxicity is the same for plants and animals. Once in the tissues, arsenic exerts its toxic effect through several mechanisms, the most significant of which is the reversible combination

with sulfhydryl groups. There are sulfhydryl groups on the dihydrolipoate, part of the pyruvate dehydrogenase complex, and arsenic binds to these and prevents the oxidation of dihydrolipoate to lipoate. Lipoate is needed in the formation of acetyl-CoA from pyruvate and in the formation of succinyl-CoA from alpha-ketoglutarate. Therefore, arsenic blocks the Krebs cycle and interrupts oxidative phosphorylation, resulting in a marked depletion of cellular ATP and eventually death of the metabolising cell.



Arsenic also inhibits the transformation of thiamine into acetyl-CoA and succinyl-CoA resulting in the features of thiamine deficiency. Arsenic inhibits numerous other cellular enzymes – those involved in cellular glucose uptake, gluconeogenesis, fatty acid oxidation and production of glutathione (an antioxidant) – through sulfhydryl group binding.

A second major form of toxicity is termed "arsenolysis." Arsenic oxyanions (AsO_4^-)can substitute for phosphate (PO_4^-) in many reactions, so where ADP would normally be phosphorylated to form ATP, in the presence of arsenic, ADP-arsenate is the end product and high-energy phosphate bonds are not formed. The unstable ADP-arsenate decomposes spontaneously and irreversibly, resulting in loss of energy by the cell.

Therefore, arsenic is capable of inhibiting oxidative phosphorylation through two different mechanisms.

In mammals the most sensitive endpoints appear to be immunosuppression and hepato-renal dysfunction. However, the majority of arsenic is metabolized and excreted. The pentavalent form, such as lead arsenate, is metabolized by reduction into the trivalent, followed by transformation into organic forms that are excreted within several days via the urine.

Very high doses are required to cause clinical signs of arsenic intoxication. Since for the purposes of ecological risk assessment, only adverse effects on population stability are relevant, effects on reproduction, development, or growth were considered the most appropriate endpoints. At relatively high doses, reduction in litter size, high male/female birth ratios, and fetotoxicity without significant fetal abnormalities, may occur. However, these may not normally occur in the wild because animals refuse to eat diets with high levels of arsenic.

In birds, reduced adult body weight, egg production and nestling body weight may be the result of decreased energy reserves. It is not known if birds reject diets with high levels of arsenic, but such activity could also lead to the above listed adverse effects.

Cadmium

Cadmium is a mutagen, terratogen, and a suspected carcinogen (RTECS 1991). In sufficient quantities, cadmium is toxic to microorganisms, algae, vascular plants, invertebrates, and vertebrates. Cadmium can be acutely toxic, and it is known to bioaccumulate in food chains (Eisler 1985a). Characteristic manifestations of cadmium toxicity include decreased growth and reproduction, respiratory disruption, alteration of life history patterns, negative effects on enzyme systems, and abnormal muscular function (Eisler 1985a). Tissue levels of cadmium increase with the age of the organism, and eventually act as a cumulative poison (Hammons and Huff 1978).

Cadmium at concentrations of 15, 30, 40, 95, and 145 mg/kg dry weight (dw) in soil have been associated with a 25 percent yield depression for sudangrass, alfalfa, clover, fescue, and bermuda grass, respectively (Bingham et al. 1976). Leaf, stem, and root dry weights of silver maple seedlings were significantly reduced by $CdCl_2$ concentrations of 5, 10, and 20 mg/kg dw in soil (Lamoreaux and Chaney 1977). Soybeans and winter wheat grown in silty clay loam (pH 6.7; organic matter content 4 percent) spiked with $CdCl_2$ at concentrations of 0, 2.5, 5, 10, 15, 20, 30, 40, 50, and 100 mg/kg dw demonstrated an increase in the bioaccumulation of Cd in plant tissue and a decrease in plant yields. These effects were positively correlated with Cd in soil, and effects began to occur in both crops at the lowest level of Cd (2.5 mg/kg) (Haghiri 1973).

Cadmium is a naturally occurring metal that is used in various chemical forms in metallurgical and other industrial processes, and in the production of pigments. Environmental exposure can occur via the diet and drinking water (ATSDR 1989).

The most important soil factors influencing plant cadmium accumulation are soil pH and cadmium concentration. Soil cadmium is distributed between a number of pools or fractions, of which only the cadmium in soil solution is thought to be directly available for uptake by plants. Soil pH is the principal factor governing the concentration of cadmium in the soil solution. Cadmium absorption to soil particles is greater in neutral or alkaline soils than in acidic ones and this leads to increased cadmium levels in the soil solution. As a consequence, plant uptake of cadmium decreases as soil pH increases. Other soil factors that influence the distribution of cadmium between the soil and soil solution include cation exchange capacity and the contents of the hydrous oxides of manganese and iron, organic matter, and calcium carbonate. Increases in these parameters result in decreased availability of cadmium to plants owing to a reduction of the level of cadmium in the soil solution.

In general, cadmium concentrations in terrestrial and aquatic biota from uncontaminated localities are low, corresponding to the geochemical abundance of this metal. However, in certain situations, cadmium displays a propensity for marked bioaccumulation, a feature that has implications for human dietary exposure and may be of toxicological significance for the organisms concerned.

Some marine birds and mammals contain remarkably elevated cadmium burdens in the kidney and liver. In the case of oceanic species, this accumulation is probably a natural process associated with the feeding habits and longevity of the organism in question. Even so, the high cadmium levels in pelagic sea-birds have been linked in one study to morphological signs of kidney damage.

Metallothionein is a metal-binding protein of low molecular weight, which has a key role in the metabolism of cadmium. Metallothionein-bound cadmium in food does not appear to be absorbed and/or distributed in the same way as inorganic cadmium compounds. Mice exposed to cadmium-thionein (Cherian et al., 1978)had lower blood and liver cadmium levels but a higher kidney level than mice exposed to the same amount of cadmium as the chloride.

The highest cadmium levels in exposed animals are generally found in the liver and renal cortex. However, the distribution in the body varies according to the route of administration.

Copper

Copper (Cu) is a common element that is also a micronutrient for all living organisms. Cu normally occurs as a sulfide salt in ancient marine sedimentary rocks, but is also common in soils weathered from these rocks. Cu is only bioavailable in its monovalent (Cu^{+}; unstable) and stable divalent (Cu^{2+}) state.

Fate and Transport

The solubility of Cu salts is enhanced by acidic conditions and Cu may be leached from soils to groundwater and transported to surface water under acidic conditions. Cu also forms tight bonds with organic matter and this reduces transport.

Ecological Effects

Plants and Soil Invertebrates

Plants may be exposed to Cu in the soil pore-water and soil invertebrates may be exposed in both the pore-water and through the diet. Excessive concentrations of soluble Cu can cause growth inhibition and reduce phytosynthesis in plants. Similarly, soluble Cu can cause toxicity to soil invertebrates such as earthworms.

Aquatic Invertebrates and Fish

Aquatic invertebrates may acquire copper from the water column, the sediment pore-water (indwelling species), or from the diet. Fish may acquire copper from the water column or from the diet. Copper is very toxic to both invertebrates and fish when it is bioavailable. However the intrinsic toxicity of copper is ameliorated by binding to organic matter and by calcium in moderately hard to hard water. Copper is an essential micronutrient and is metabolically regulated except at very high concentrations.

Birds and Mammals

Birds and mammals are mainly exposed to Cu through the diet, but copper may also be acquired through the incidental ingestion of soil during feeding. Because copper is an essential micronutrient the amount of Cu that is taken up is regulated by the body and large concentrations of copper are required to cause toxicity. The liver and kidney are the main targets of excess Cu.

Appendix B
Toxicity Profiles for Constituents of Potential Ecological Concern

Lead

Lead (Pb) is a natural element that is persistent in water and soil. Pb occurs naturally as a sulfide in the ore, galena. It is a soft, bluish-white, silvery gray, malleable metal that may dissolve in water under certain conditions, particularly at low pH. The solubility of Pb salts in water varies from insoluble to soluble depending on the type of salt formed. While Pb is not bioaccumulative, it is persistent in soils and toxic when bioavailable. It was commonly used in conjunction with arsenic as a plant growth regulator and as a household insecticide.

Fate and Transport

Pb in its bioavailable form is present as a divalent cation, Pb^{2+}. Divalent Pb forms salts with different anions that are sensitive to pH and begin to precipitate out of solution at about 7.0. This is particularly true of phosphate and carbonate Pb salts. In the anaerobic conditions typically found in sediments, Pb forms a very tight bond with sulfide (galena), which reduces lead bioavailability for uptake or toxicity to organisms. However, dissolved Pb may leach into the groundwater and be transported to surface waters.

Ecological Effects

Terrestrial Plants and Soil Invertebrates

Plants may be exposed to Pb in the soil pore-water and soil invertebrates may be exposed in both the pore-water and through the diet. Excessive concentrations of soluble Pb can cause growth inhibition and reduce phytosynthesis in plants. Similarly, soluble Pb can cause toxicity to soil invertebrates such as earthworms.

Aquatic Invertebrates and Fish

Fish and invertebrates may be exposed to lead from direct contact in the water column and through the diet. However, except in acidified water bodies, lead precipitates from solution and contributes relatively little to uptake. Furthermore, lead is poorly absorbed across the gut of fish and invertebrates. Therefore, lead does not biomagnify in the food chain.

Birds and Mammals

Birds and mammals are mainly exposed to Pb through the diet. Pb from soils is poorly absorbed across the gut and concentrations in food never exceed those in the soil. Once Pb is absorbed into the body it is distributed to three major compartments: blood, soft tissue, and bone. The largest compartment is the bone, which contains about 95% of the total body Pb burden in adults and about 73% in young. Blood Pb is in equilibrium with lead in bone and soft tissue and may be mobilized in birds during egg production.

Pb may cause effects in the gastrointestinal tract, hematopoietic system, cardiovascular system, central and peripheral nervous systems, kidneys, immune system, and reproductive system.

Mercury

Fate and Transport

Mercury may be present in the environment in a number of forms. In all inorganic forms, Hg^{2+} is the toxic species. The most toxic and bioavailable form of mercury is methylmercury (MeHg), which is highly stable and lipophilic, accumulating in food chains. Mercury can become methylated biologically or chemically under anaerobic conditions common in wetlands and aquatic sediments. The majority of mercury detected in biological tissues is present in the form of methylmercury (Huckabee et al. 1979).

Mercury can exist in three oxidation states: elemental mercury (Hg^0), mercurous ion (Hg_2^{2+}), and mercuric ion (Hg^{2+}). The mercuric ion is the most toxic inorganic chemical form (Clarkson and Marsh 1982). Methylmercury is the most hazardous form of mercury due to its high stability, its lipid solubility, and the ability to penetrate membranes in living organisms (Beijer and Jernelov 1979).

Ecological Effects

Mercury (Hg) has no known biological function, and its presence in biological systems appears to result in undesirable effects. A number of toxic responses have been reported for mercury exposure. Eisler (1987) reports that juvenile life stages are most susceptible to acute effects of mercury exposure. In fish, acute exposure results in impaired respiration, sluggishness, and loss of equilibrium (Armstrong 1979).

Mercury is a potent neurotoxin, resulting in impaired muscular coordination, weight loss, and apathy in birds, mammals, and fish (Eisler 1987). Other reported effects include histopathological changes, changes in enzyme activity levels, mutagenicity, teratogenicity, and reproductive impairment. Mercury, especially methylmercury, is known to concentrate in biological tissues and magnify through the food chain.

Mercury and its compounds have no known biological function. It is a mutagen, teratogen, and carcinogen, and causes embryocidal, cytochemical, and histopathological effects. Forms of mercury with relatively low toxicity can be transformed into forms of very high toxicity, such as methylmercury, through biological processes.

Mercury in soils is generally not available for uptake by plants, due to the high binding capacity to clays and other charged particles (Beauford et al. 1977). Mercury levels in plant tissues increase as soil levels increase, however 95 percent of the accumulated mercury is retained in the root system and does not pass to the leaves or shoots (Beauford et al. 1977; Cocking et al. 1991).

All mercury compounds interfere with thiol metabolism in organisms, causing inhibition or inactivation of proteins containing thiol ligands and ultimately leading to mitotic disturbances (Das et al. 1982; Elhassani 1983). Mercury also binds strongly with sulfhydryl groups. Phenyl- and methylmercury compounds are among the strongest

known inhibitors of cell division (Birge et al. 1979). In mammals, methylmercury irreversibly destroys the neurons of the central nervous system.

For all organisms tested, early developmental stages were most sensitive to toxic effects of mercury. Organomercury compounds, especially methylmercury, were more toxic than inorganic forms. In aquatic organisms, mercury adversely affects reproduction, growth, behavior, osmoregulation and oxygen exchange. At comparatively low concentrations in birds and mammals, mercury adversely affects growth and development, behavior, motor coordination, vision, hearing, histology, and metabolism. In mammals, the fetus is the most sensitive life stage (Eisler 1987).

Selenium

Fate and Transport

Selenium chemistry is complex, existing as six stable isotopes of varying allopatric forms and valence states. Of these isotopes, Se-80 and Se-78 are the most common. Soluble selenates (+6) occur in alkaline soil and are slowly reduced to selenites (+4) that are readily taken up by plants. In acid or neutral soils, the amount of biologically available selenium should steadily decline. Selenium volatilizes from soils at rates that are modified by temperature, moisture, time, season, concentration of water-soluble selenium, and microbiological activity (Eisler 1985b).

Concentrations of selenium in water are largely a function of selenium levels in drainage systems and of water pH. High selenium levels tend to be associated with high water pH. Selenates represent the dominant species in drinking water. In seawater, selenites are the dominant species under some conditions. Selenites are less soluble than selenates and are easily reduced to elemental selenium. Elemental selenium is insoluble and largely unavailable although it is capable of satisfying nutritional selenium requirements (Eisler 1985b).

Selenium is an essential nutrient for some plants and animals, constituting an integral part of the enzyme glutathione peroxidase and may have a role in other compounds such as vitamin E and the enzyme formic dehydrogenase. Selenium also forms part of certain proteins, including cytochrome C, hemoglobin, myoglobin, myosin, and various ribonucleoproteins. In many systems, selenium deficiency is a larger problem than selenium toxicity (Eisler 1985b).

Ecological Effects

Selenium (Se) accumulation in certain species of plants may be extremely high. Consumption of selenium-accumulating plants by livestock has induced illness and death. Plants that accumulate selenium tend to be more deep-rooted than grasses, thereby surviving aridity and remaining as the principal forage for herbivorous animals. The concentration of selenium in animals tends to be higher in older than in younger individuals. In livestock, selenium is distributed by the circulatory system to all body organs. Concentrations tend to be highest in the liver, blood, kidney, spleen, and brain, and lowest in muscle, skin, hair, and bone. Elimination is primarily by urination, and smaller amounts are excreted with feces, breath, perspiration, and bile (Eisler 1985).

Sublethal effects of elevated levels of selenium in diet or water are associated with reproductive abnormalities, congenital malformations, selective bioaccumulation, growth retardation, chromosomal aberrations, intestinal lesions, and behavioral modifications (Eisler 1985).

Selenium is more concentrated in the visceral tissue than skeletal muscle tissue of fish. Bioaccumulation factors for selenium in the visceral tissue of fish have been reported from 1,058 to 3,980 and in skeletal muscle from 485 to 1,746 (Meditext 1997). There is some evidence that selenium may biomagnify under certain conditions in aquatic organisms (Meditext 1997).

Zinc

In its' bioavailable form, zinc (Zn) exists as the cation, Zn^{2+}. Zn is used primarily in galvanized metals and metal alloys, but zinc compounds also have wide commercial applications including the rodenticide, zinc phosphide. While Zn is not bioaccumulative, it is persistent and may be toxic. Under normal conditions, zinc is also an essential micronutrient that is regulated by organisms

Fate and Transport

Bioavailable zinc (Zn^{2+}) forms salts with anions such as nitrate, carbonate, phosphate, and sulfate. Like lead, Zn carbonate and phosphate precipitate from solution in circumneutral pH conditions, and, under anaerobic conditions, zinc combines with sulfide to form a relatively insoluble salt. However, Zn may leach into groundwater and may be transported to surface waters. Under acidic conditions, Zn is readily soluble and easily transported to both ground and surface waters.

Ecological Effects

Zn is an essential micronutrient for both plants and animals, and both plants and animals regulate zinc uptake. Zn deficiency is more common than toxicity, and deficiency leads to reproductive failure and reduced growth rates.

Terrestrial Plants and Soil Invertebrates

Plants and soil invertebrates may be exposed to Zn in the soil pore-water and soil invertebrates may be further exposed through the diet. Plants and soil invertebrates may be intoxicated in soils containing high concentrations of Zn, particularly if the soils have also been acidified by acid deposition as occurs near ore smelting facilities.

Aquatic Invertebrates and Fish

Fish and invertebrates may be exposed to zinc in the water column and through the diet. Since zinc forms solid salts with carbonate and phosphate that precipitate from solution at circumneutral pH, most zinc is acquired through the diet. However, in acidic pH, zinc may also be acquired from the water column.

Birds and Mammals

Birds and mammals acquire zinc mainly through the diet. Gastrointestinal absorption of zinc is variable and depends on the chemical compound as well as on zinc levels in the body and dietary concentrations of other nutrients. Zinc is a vital component of many metalloenzymes such as carbonic anhydrase, which regulates CO_2 exchange. Homeostatic mechanisms involving metallothionein in the mucosal cells of the gastrointestinal tract regulate zinc absorption and excretion.

Chronic oral exposures to Zn may result in hypochromic microcytic anemia associated with hypoceruloplasminemia, hypocupremia, and neutropenia in some individuals. Anemia and pancreatitis were the major adverse effects observed in chronic animal studies. Teratogenic effects have not been seen in animals exposed to Zn; however, very high oral doses can affect reproduction and fetal growth.

The adverse effects of Zn found in birds may be due to the competition for calcium binding sites in the eggshell gland. These effects likely do not occur in the wild where soils contain high levels of calcium.

Aroclors 1254 and 1260

Aroclors 1254 and 1260 are two of a group of 209 synthetic halogenated aromatic hydrocarbons called PCBs that are extremely stable, bioaccumulate, and are resistant to most chemical and biological degradation processes (Eisler 1986; Hornshaw et al. 1983). The persistence and stability of PCBs in the environment are due to chemical properties such as their lipophilicity and stable carbon-halogen bonds (Risebrough et al. 1968). In general, polychlorinated biphenyls have low aqueous solubility (Chou and Griffin 1986).

Fate and Transport

In terrestrial systems, PCBs are not readily leachable in soils and strongly sorb to soil constituents (Chou and Griffin 1986; Strek and Weber 1982). Their level in soil is proportional to the organic matter and clay content of the soil (Chou and Griffin 1986). The uptake of PCBs from soils by terrestrial plants is very low (Iwata et al. 1974; Iwata and Gunther 1976; Weber and Mrozek 1979). Plants do not readily accumulate PCBs from the soil. However, PCBs do settle on and adhere to the outside surfaces of plants (Horn et al. 1979).

Upon entering an aquatic system, PCBs may partition between the water, sediment, air, particulate matter, and biota (Koslowski et al. 1994). The more lipophilic and hydrophobic a substance, the more concentrated it will be in the sediment and phytoplankton of an aquatic system (Loizeau and Menesguen 1993). While it has been shown that transport of PCBs in the dissolved phase can be important during the warmer low flow periods of summer, PCBs are extremely lipophilic, and they generally sorb strongly to sediment particles. It has been shown that PCBs discharged to aquatic environments rapidly sorb to sediment and are usually deposited in bottom sediments, often close to the area of discharge (Kalmaz and Kalmaz 1979). After this, dispersal and movement of PCBs in aquatic systems depends largely on the movement of the associated sediments (Connell and Miller 1984).

Because PCBs are extremely lipid-soluble, they also tend to accumulate in the lipid component, internal organs, and mesenteric fat of organisms (Eisler 1986). Optimum accumulation of PCBs by aquatic biota occurs when planar molecules are substituted with 5 to 7 chlorine atoms (Shaw and Connell 1984). Uptake of PCBs by aquatic plants has been reported (Moza et al. 1974). Rapid gill uptake of PCBs has been observed in short-term laboratory experiments with fish (Bruggerman et al. 1981). Generally, when equally exposed, fish accumulate two to three times more PCBs than aquatic invertebrates (Eisler 1986). Once absorbed, PCBs generally partition into the fatty tissues of organisms (Ernst et al. 1976; Phillips 1980; Shaw and Connell 1980). In contrast, PCB concentrations in a salmonid population were found to be related to fish size as well as fish age (Madenjian et al. 1994).

Controversy exists regarding the relative contribution of food versus direct uptake in determining PCB levels in the tissues of aquatic biota (Rasmussen et al. 1990). Field-collected fish specimens were found to have significantly greater PCB body burdens than laboratory specimens exposed to identical concentrations in water, suggesting that food-

chain transfer of PCBs is an important mode of contaminant transfer for top predators (Thomann 1981). In addition, PCB levels detected in field-collected salmonids have exceeded by around 10-fold those levels predicted by theoretical and experimental bioconcentration models (MacKay 1982). Thomann et al. (1992) suggests that PCBs with octanol-water partition coefficients (Kows) greater than 105 seem to enter the biota via food-web transfer originating from sediment levels as opposed to direct uptake from water.

Ecological Effects

Much of the toxicity caused by PCBs has been attributed to the planar congeners that resemble 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) (Geisy et al. 1994). The toxic nature of some prepared PCB mixtures may be associated with trace levels of compounds having four or more chlorine atoms at both the *para* and *meta* positions (Koslowski et al. 1994; Tanabe et al. 1987); the biphenyl structure may be substituted with one to ten chlorine atoms. These isostereomers of 2,3,7,8-TCDD are known to elicit toxic biological responses in animals such as hepatic damage, weight loss, thymic atrophy, dermal disorder, reproductive toxicity, immunosuppresion, teratogenicity, and functional effects to the spleen, adrenal and testis (Batty 1990; Sanders et al. 1974; Tanabe et al. 1987).

The general sublethal effect of PCBs to plants is reduced growth via a reduction in photosynthetic activity as a result of diminished chlorophyll content of the plant (Strek and Weber 1982; Iwata et al. 1974; Iwata et al. 1976; Weber and Mrozek 1979; Moza et al. 1974; Mahanty 1973). The most studied biochemical effect of PCBs in animals is the induction of hepatic mixed function oxidase systems, increasing an organism's capacity to biotransform or detoxify xenobiotic chemicals. Enzymes in this system are sometimes referred to as drug-metabolizing enzymes (DMEs) (Kluwe et al. 1979). Although the increased capacity to detoxify xenobiotic chemicals may appear to benefit an organism, the metabolism of the foreign chemicals often produces metabolites that are more toxic than the parent compound (Mitchell et al. 1976). In addition, PCB-induced changes in enzyme activity may also alter enzyme substrate concentrations in other metabolic pathways (Montz et al. 1982). The PCBs also induce microsomal hepatic enzyme systems that metabolize naturally occurring steroid hormones (Peakall 1975). The degree of this enzyme system response has been found to be positively dose-related (Linzey 1987). Polychlorinated biphenyl-induced effects to these hepatic enzyme systems result in increased liver weight, fatty degeneration, hyalin degeneration, necrosis, hepatocyte formation, and increased hormone metabolism in animals (Batty et al. 1990; Lincer and Peakall 1970; Sanders and Kirkpatrick 1977; Sanders et al. 1974; Stotz and Greichus 1978; Vos 1972; Welsch 1985).

Chlorinated hydrocarbons such as PCBs have been implicated as a cause of reproductive dysfunction and mortality in wildlife species (Heaton et al. 1995; Hoffman et al. 1986; Langford 1979). Exposure to PCBs has been found to reduce litter sizes at birth, number of litters, and longer birthing intervals in mice (Linzey 1987; Merson and Kirkpatrick 1976) and reduce plasma concentrations of estradiol and progesterone in female rats (Johnson et al. 1976). Transplacental movement of PCBs has been reported for humans,

rabbits, monkeys, and rats causing a dose-dependent reduction in the body weights and survival of pre-natally, as well as post-natally, exposed mammalian offspring (Barsotti et al. 1976; Brezner et al. 1984; Fein et al. 1984; Heaton et al. 1995; Wren et al. 1987a,b). PCB transfer to mammalian offspring continues via mother's milk (Wren et al. 1987a). Polychlorinated biphenyls have been implicated as the cause of low embryonic weight in black-crowned night herons (*Nycticorax nycticorax*) (Hoffman et al. 1986). Persistence in courtship behavior was reduced in PCB-fed mourning doves (*Zenaida macroura*) (Tori and Peterle 1983). Reduced sperm concentration, thin-shelled eggs, poor hatching success, and offspring born with teratogenic abnormalities have also been reported (Abrahamson and Allen 1973; Bird et al. 1983; Lowe and Stendell 1991; Scott 1977). PCBs have also been shown to transfer from the mother to her eggs in fish (Niimi 1982; Mac and Schwartz 1992) and have been implicated in reduced hatching success, larval mortality, and larval growth of fish (Mac and Schwartz 1992; Hendricks et al. 1981; Mac and Edsall 1991; Mac et al. 1993). PCBs have also been associated with toxic effects on benthic invertebrates in freshwater systems (Ingersoll et al. 1996, Smith et al. 1996).

DDT

Technical grade DDT (1,1,1-trichloro-2,2-*bis*(*p*-chlorophenyl)ethane) is a mixture of three forms, *p,p'*-DDT (85%), *o,p'*-DDT (15%), and *o,o'*-DDT (trace amounts). All of these are white, crystalline, tasteless, and almost odorless solids. Technical grade DDT is made from chloral hydrate, chlorobenzene, and sulfuric acid. Also, DDE (1,1-dichloro-2,2-*bis*(*p*-chlorophenyl)ethylene) and DDD (1,1- dichloro-2,2-*bis*(*p*-chlorophenyl)ethane) sometimes contaminate technical grade DDT. DDT was a widely used chemical to control insects on agricultural crops and insects that carry diseases like malaria and typhus. In the following discussion, the term DDT will be used to refer to all of these isomers and metabolites of DDT.

Fate and Transport

Once in the environment, DDT in soil is extremely persistent. Some studies show that half the DDT in soil breaks down within 2 years, but other studies show that it takes more than 15 years. DDT in soil usually breaks down to form DDE or DDD. Of the two primary isomers of DDT, 4,4'- and 2,4'-DDT, the latter breaks down faster than the former.

Since DDT attaches tightly to soil, its mobility is very low. Hence, groundwater resources are not at immediate threat. DDT may attach to small particles and be carried by the wind. In surface water, DDT may also bind to soil particles mixed in water and settle to the bottom of the body of water where it can enter the food chain.

Ecological Effects

Terrestrial Plants and Soil Invertebrates

Plants may be exposed to DDT and its metabolites through direct contact with soil pore-water. However, there is no evidence that plants are adversely affected by DDT or its metabolites and only to a very limited extent may be absorbed into plant tissues.

Soil invertebrates may be exposed to DDT and its metabolites through direct contact with soil pore-water or through ingestion of contaminated soil or prey. DDT was designed to be, and is, toxic to insects. However, other soil invertebrates such as earthworms are relatively insensitive. As with aquatic invertebrates, under chronic low-level exposure conditions, DDT, DDE, and DDD accumulate in soil invertebrates according to the percentage lipid (fat) they contain. Toxicity occurs when the DDT concentration reaches a certain critical body burden. Because soil invertebrates may contain large fat reserves, much of the DDT found in higher trophic invertivores comes through the food chain from soil invertebrates.

Aquatic Invertebrates and Fish

Aquatic invertebrates may acquire DDT from the water column, the sediment pore-water (indwelling species), or from the diet. Under chronic low level exposure conditions, DDT accumulates in invertebrates according to the percentage lipid (fat) they contain, and toxicity occurs when the DDT concentration reaches a certain critical body burden is reached. Since DDT was developed as an insecticide, it is very toxic to insects and some

amphipods. However, DDT is not particularly toxic to either polychaete or oligochaete worms or mollusks.

Fish may acquire DDT from the water column or from the diet. As with invertebrates, under chronic low level exposure conditions, DDT, DDE, and DDD accumulate in fish according to the percentage lipid (fat) they contain, and toxicity occurs when the DDT/DDE/DDD concentration reaches a certain critical body burden is reached. The sensitivity of fish to DDT toxicity varies by family, with salmonids being the most sensitive and cyprinids and ictalurids being the least sensitive. Although DDT has weak estrogenic effects, and has the potential to cause sexual disorders when presented during critical periods in development the concentrations required are not within the pharmacokinetic range and do not affect reproduction in the laboratory or field. Much of the DDT found in fish comes through the food chain from invertebrates.

Birds and Mammals

Birds and mammals may be exposed to DDT through the diet and, to a much lesser extent, through the incidental ingestion of soil and through drinking water. Adverse health effects of 4,4'-DDT in animals include reproductive and developmental failure, and possible immune system effects. 2,4'-DDT is not considered to have adverse effects on bird or mammal populations. As is the case with many organochlorine insecticides, a major target of acute 4,4'-DDT exposure is the nervous system. Long-term administration of 4,4'-DDT has brought about neurological, hepatic, renal, reproductive, and immunologic effects in animals. Unlike birds, mammals are very insensitive to 4,4'-DDT or 4,4'-DDE effects on reproduction. Research has shown that 4,4'-DDT can prevent androgen from binding to its receptor thereby blocking androgen from guiding normal sexual development in male rats and resulting in abnormalities. However, very high concentrations of 4,4'-DDT or 4,4'-DDE are required to produce these effects and such high doses are unlikely to occur in nature.

The most important adverse effect of 4,4'-DDT and 4,4'-DDE on birds is a decreased eggshell thickness and subsequent increased eggshell breakage rate. 4,4'-DDD is not considered to have adverse effects on bird eggshell thickness. Once in the body, 4,4'-DDT is broken down to 4,4'-DDE and the active toxicant is 4,4'-DDE, not the other isomers. 4,4'-DDE acts on the shell gland in susceptible species and interferes with calcium deposition into the developing eggshell. However, this effect is not universal among birds. While species such as the brown pelican appear to be extremely sensitive, other species such as the mallard duck are insensitive. Other chemicals and factors such as a calcium-poor diet can also cause eggshell thinning.

Methoxychlor

Methoxychlor, also known as DMDT, Marlate®, or Metox®, is a manufactured chemical now used in the United States for controlling insects. Methoxychlor is effective against flies, mosquitos, cockroaches, and a wide variety of other insects. This insecticide is used on agricultural crops and livestock, and in animal feed, barns, and grain storage bins. Some pesticide products that contain methoxychlor are used for controlling insects in gardens or on pets (ATSDR 2002).

Pure methoxychlor is a pale-yellow powder that has a slightly fruity or musty odor. It does not readily evaporate into air or dissolve in water. Pesticide workers usually dissolve methoxychlor in a petroleum-based liquid and apply it as a spray, or they mix it with other chemicals and apply it as a dust. Application of methoxychlor as an insect killer accounts for most of the methoxychlor that enters the environment. Since the use of methoxychlor is highly seasonal, the amount that is released to the environment tends to be greater during periods of insect control (spring and summer). Some methoxychlor is released to the environment from chemical manufacturing plants that make methoxychlor or from manufacturing sites that formulate products containing methoxychlor. A small amount may also be released from hazardous waste sites where it has been disposed of (ATSDR 2002).

Fate and Transport

Methoxychlor does not occur naturally in the environment. Most methoxychlor enters the environment when it is applied to forests, agricultural crops, and farm animals. Methoxychlor can be applied to forests and crops by aerial spraying. This process can contaminate nearby land and water. Methoxychlor that is released into the air will eventually settle to the ground, although some may travel long distances before settling. Rain and snow cause methoxychlor to settle to the ground more quickly (ATSDR 2002)..

Once methoxychlor is deposited on the ground, it becomes bound to the soil. Because of this, methoxychlor does not tend to move rapidly from one place to another. However, soil particles that contain methoxychlor can be blown by the wind or be carried by rainwater or melted snow into rivers or lakes. Most methoxychlor stays in the very top layer of soil, but some of the products that it breaks down into may move deeper into the ground. Smaller amounts of methoxychlor in air may settle directly into rivers, lakes, and other surface waters. Once methoxychlor is in water, it usually binds to sediments or organic matter and settles to the bottom (ATSDR 2002).

Methoxychlor is broken down in the environment by several processes. However, these processes are slow and may take months. In soil, some methoxychlor is broken down by bacteria and other microorganisms, and some is broken down by a reaction with water or materials in soil. In air and water, some methoxychlor is broken down by sunlight. Methoxychlor is also broken down by reactive chemicals normally present in the air. Some of the breakdown products are capable of producing harmful effects similar to those caused by exposure to methoxychlor (ATSDR 2002).

Methoxychlor can accumulate in living organisms, including algae, bacteria, snails, clams, and some fish. However, most fish and animals change methoxychlor into other substances that are rapidly released from their bodies, so methoxychlor does not usually build up in the food chain (ATSDR 2002)..

Ecological Effects
In animals, exposure to very high levels of methoxychlor produced neurologic effects such as tremors, convulsions, and seizures. Because methoxychlor is broken down quickly in the body, neurologic effects are unlikely unless there is exposure to very high levels. Animal studies show that exposure to methoxychlor in food or water harms the ovaries and uterus in females, and the testes and prostate in males. Fertility is decreased in both male and female animals. It is expected that these effects could occur following inhalation or skin contact.

Mammals
Rats fed from very low to high doses of methoxychlor (10 to 2,000 mg/kg) for two years had growth retardation above 200 ppm but no tissue damage from the methoxychlor. Loss of body weight and growth retardation were the most frequent effects in lab animal studies. These effects were attributed to food refusal rather than to methoxychlor toxicity (U.S. EPA 1987).

Rats fed low doses (about 50 mg/kg/day) in their diet had normal reproduction but slightly higher doses (150 mg/kg/day) fewer animals mated and many did not produce litters. At about 250 mg/kg/day none of the rats had litters or embryo implantation. In another study male rats given 100 to 200 mg/kg/day suffered arrested sperm production after 70 consecutive days and females rats produced ovarian effects (U.S. EPA 1987).

When a methoxychlor formulation containing 50% active ingredient and 50% unknown compounds was administered to pregnant female rats, adverse effects in the fetus occured only at doses large enough to be toxic to the dams. These effects were thought to be due to the disruption of the maturation process rather than due to the direct toxic effects of methoxychlor (U.S. EPA 1989). At 400 mg/kg, the pesticide killed rat embryos and at 200 mg/kg there was increased incidence of resorption, small litter size, and low fetal weights.

Most mutation assays have proven to be negative. There is no convincing evidence that methoxychlor is toxic to genetic material.

Two strains of mice were fed diets containing low levels (40 mg/kg) methoxychlor for two years. There was no significant incidence of liver tumors but one strain did have increased testicular tumors (NRC 1977). After evaluating the data, National Cancer Institute and the International Agency for Research on Cancer both conclude that methoxychlor is not an animal carcinogen.

Chronic effects include liver cell degeneration and kidney damage. Death is usually due to respiratory failure from paralysis in the brain. Central nervous depression is more prominent than excitation.

Methoxychlor does not accumulate to any significant degree in fat or other tissues of mammals (Smith 1991). At high dietary doses, low levels of methoxychlor were detected in the fat of rats though it cleared the body readily after dietary intake stopped (two weeks). Mice excreted 98.3% of a 50 mg/kg dose in the urine and feces within 24 hours. When rats were injected with 3 mg/kg, 50% was excreted in the feces and 5 to 10% in the urine in four days. The major metabolites in mouse feces and urine were the monophenol and bisphenol. Other metabolites were present also but methoxychlor itself does not appear to undergo dehydrochlorination.

Lactating cows treated twice in 14 days with sprays of 0.25 to 0.5% (2 quarts per animal) had residues of 2 to 3 ppm in milk. After 14 days, levels were at the limit of detection (0.005 ppm).

Birds

Methoxychlor shows low toxicity to mallards, Japanese quail, pheasants and bobwhite quail. No mortality occurred in these species after being exposed at 250 mg/kg in their diets for five days (Hudson et al. 1984).

Fish

Most fish are sensitive to the pesticide. The 96-hour LC50 for fish ranges from 1.7 ppb for Atlantic salmon to 5,200 ppm for channel catfish. The bioconcentration factors for fish ranges from 138 in sheepshead minnows to 8,300 in the fathead minnow. Bioconcentration factors were the highest in the mussel (12,000) and in the snail (8,570). This indicates that methoxychlor would accumulate in aquatic organisms that do not rapidly metabolize the compound. Fish do metabolize methoxychlor fairly rapidly and thus tend not to accumulate it appreciably (Howard 1991).

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APPENDIX C
Request for Database Search for Threatened and Endangered Species

March 9, 2004

Mr. Ron Hellmich
Heritage Information Manager
Division of Nature Preserves
Indiana Department of Natural Resources
402 West Washington Street, Room W267
Indianapolis, Indiana 46204

RE: IDNR Database Search Request for Threatened and Endangered Species

Dear Mr. Hellmich,

I am writing to request a search of threatened and endangered species potentially inhabiting the area in the vicinity of an industrial site of approximately 440 acres, located in the city of East Chicago, Lake County, Indiana. A topographic map is attached to provide the specific site location. URS is in the process of completing a Screening Level Ecological Risk Assessment (SLERA) for the site as part of RCRA Corrective Action. Please perform a search of the area within a one-mile radius of this location and notify us of any known threatened or endangered species in the vicinity of this site. To expedite this process, I would appreciate a faxed copy of your findings, followed by a written letter.

Please do not hesitate to call me with questions regarding this request at (215) 619-4115. Thank you for your time and consideration in this matter.

Sincerely,

Jennifer B. Foulk
Biologist

December 2, 2004

Mr. Michael Litwin
U.S. Fish and Wildlife Service
620 South Walker St.
Bloomington, IN 47403-2121

RE: USF&WS Database Search Request for Threatened and Endangered Species

Dear Mr. Litwin,

In response to a consent order from USEPA Region 5, URS Corporation on behalf of the DuPont Company is performing an RFI in compliance with RCRA Corrective Action. I am conducting the Baseline Ecological Risk Assessment for the site and am writing to request a search of your records for threatened and endangered species potentially inhabiting the area in the vicinity of the site.

The site is a former industrial facility on approximately 440 acres, located in the city of East Chicago, Lake County, Indiana. A topographic map is attached to provide the specific site location.

We would appreciate information on the presence of federally listed species or valued habitat on or within a one-mile radius of this location. A similar request is being submitted to the IDEM Natural Heritage Data Center for state listed species.

Please do not hesitate to call me with questions regarding this request at (215) 367-2478. Thank you for your time and consideration in this matter.

Sincerely,

Jon I. Parker, PhD
Project Manager, Senior Project Ecologist

December 2, 2004

Mr. Ron Hellmich
Heritage Information Manager
Division of Nature Preserves
Indiana Department of Natural Resources
402 West Washington Street, Room W267
Indianapolis, Indiana 46204

RE: IDNR Database Search Request for Threatened and Endangered Species

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In response to a consent order from USEPA Region 5, URS Corporation on behalf of the DuPont Company is performing an RFI in compliance with RCRA Corrective Action. I am conducting the Baseline Ecological Risk Assessment for the site and am writing to request a search of your records for threatened and endangered species potentially inhabiting the area in the vicinity of the site.

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We would appreciate information on the presence of state listed species or valued habitat on or within a one-mile radius of this location. A similar request is being submitted to the USF&W Service for federally listed species.

Please do not hesitate to call me with questions regarding this request at (215) 367-2478. Thank you for your time and consideration in this matter.

Sincerely,

Jon I. Parker, PhD
Project Manager, Senior Project Ecologist

DNR Indiana Department of Natural Resources

Joseph E. Kernan, Governor
John R. Goss, Director

Division of Nature Preserves
402 W. Washington St., Rm W267
Indianapolis IN 46204

December 6, 2004

Mr. Jon Parker
URS Corporation
335 Commerce Dr., Suite 300
Fort Washington, PA 19034

Dear Mr. Parker:

I am responding to your request for information on the endangered, threatened, or rare (ETR) species, high quality natural communities, and natural areas documented from the DuPont East Chicago area, Lake County, Indiana. The Indiana Natural Heritage Data Center has been checked and enclosed you will find information on the ETR species documented from the project area.

For more information on the animal species mentioned, please contact Katie Smith, Nongame Supervisor, Division of Fish and Wildlife, 402 W. Washington Room W273, Indianapolis, Indiana 46204, (317)232-4080.

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. You should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service
620 South Walker St.
Bloomington, Indiana 47403-2121
(812)334-4261

At some point, you may need to contact the Department of Natural Resources' Environmental Review Coordinator so that other divisions within the department have the opportunity to review your proposal. For more information, please contact:

John Goss, Director
Department of Natural Resources
attn: Christie Kiefer
Environmental Coordinator
Division of Water
402 W. Washington Street, Room W264
Indianapolis, IN 46204
(317)232-4160

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Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)232-8059 if you have any questions or need additional information.

Sincerely,

Ronald P. Hellmich

Ronald P. Hellmich
Indiana Natural Heritage Data Center

enclosure: data sheet

12/6/200 Endangered, Threatened and Rare Species, and High Quality Natural Communities documented within one mile of the DuPont area, East Chicago, Indiana

SPECIES NAME	COMMON NAME	FED	STATE	TOWNRANGE	LASTOBS
Highland					
Wetland - marsh	Marsh		SG	037N009W 34 SEQ	1978-07
Emydoidea blandingii	Blanding's Turtle		SE	037N009W 34 SH	1991
Prairie - sand wet-mesic	Wet-mesic Sand Prairie		SG	037N009W 34 SEQ	1978-07
Wetland - meadow sedge	Sedge Meadow		SG	037N009W 34 SEQ	1978-07
Selaginella apoda	Meadow Spike-moss		WL	037N009W 34 SH	1991
Spermophilus franklinii	Franklin's Ground Squirrel		SE	037N009W 33 SWQ NWQ	8/5/1992
Solidago ptarmicoides	Prairie Goldenrod		SR	037N009W 34 SEQ NWQ SEQ	8/22/1992
Solidago ptarmicoides	Prairie Goldenrod		SR	037N009W 26 SWQ	12/28/1995
Spermophilus franklinii	Franklin's Ground Squirrel		SE	036N009W 04 SWQ NWQ NEQ	8/9/1992
Spermophilus franklinii	Franklin's Ground Squirrel		SE	037N009W 33 SEQ	9/4/2002
Spermophilus franklinii	Franklin's Ground Squirrel		SE	037N009W 34 SEQ	7/6/1990
Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	037N009W 34 SEQ	1978-07
Savanna - sand mesic	Mesic Sand Savanna		SG	036N009W 03 NH SEQ	7/21/1978
Savanna - sand dry	Dry Sand Savanna		SG	037N009W 34 SEQ	1978-07
Rallus limicola	Virginia Rail		SE	037N009W 34 SWQ	7/11/1991
Botaurus lentiginosus	American Bittern		SE	037N009W 34 SWQ	7/11/1991
Ixobrychus exilis	Least Bittern		SE	037N009W 34 SWQ	7/11/1991
Juncus balticus var. littoralis	Baltic Rush		SR	037N009W 34 SH	1991
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		SE	037N009W 34 SWQ	5/14/1991
Eriophorum angustifolium	Narrow-leaved Cotton-grass		SR	037N009W 34 SH	1991
Chlidonias niger	Black Tern		SE	037N009W 34 SWQ	6/25/1991
Carex bebbii	Bebb's Sedge		ST	037N009W 34 SH	1991
Carex aurea	Golden-fruited Sedge		SR	037N009W 34 SEQ	7/2/1991
Cistothorus palustris	Marsh Wren		SE	037N009W 34 SWQ	9/15/1991
Rallus elegans	King Rail		SE	037N009W 34 SEQ	5/22/1974
CLINE AVENUE NATURE PRESERVE					
Diervilla lonicera	Northern Bush-honeysuckle		SR	036N009W 03 NEQ NEQ	7/22/1978
Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	036N009W 03 EH NEQ	7/22/1978
Wetland - swamp shrub	Shrub Swamp		SG	036N009W 03 EH NEQ	1978-07
Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	036N009W 03 EH NEQ	1978-07
GIBSON WOODS NATURE PRESERVE					
Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	036N009W 02 SWQ	1978-07
Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	036N009W 04 EH	1978-07
Rhus aromatica var. arenaria	Beach Sumac		SR	036N009W 03 NH SH	1989
Prairie - sand wet-mesic	Wet-mesic Sand Prairie		SG	036N009W 04 EH	7/21/1978
Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	036N009W 04 EH	7/21/1978
Wetland - swamp shrub	Shrub Swamp		SG	036N009W 02 SWQ	1978-07
Problema byssus	Bunchgrass Skipper		ST	036N009W 03 NH SH	1990
Diervilla lonicera	Northern Bush-honeysuckle		SR	036N009W 03 NH SH	8/10/1991
Ixobrychus exilis	Least Bittern		SE	036N009W 03 SEQ	7/2/1985
Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slippe		SR	036N009W 03 NH SH	8/10/1991
Carex aurea	Golden-fruited Sedge		SR	036N009W 03 SWQ	1/25/1978
Prunus pensylvanica	Fire Cherry		SR	036N009W 03 SWQ NEQ SEQ	5/12/1989

Fed: LE = federal endangered; LT = federal threatened; C = candidate

State: SE = state endangered; ST = state threatened; SR = state rare; WL = watch list; SX = state extirpated; SSC = species of special concern SG = state significant

Grank: Heritage Global Rank: G1 = critically imperiled; G2 = imperiled; G3 = rare or uncommon; G4 = widespread but with long term concerns; G5 = widespread and secure; GU = unranked

Srank: State Heritage Rank: S1 = critically imperiled; S2 = imperiled; S3 = rare or uncommon; S4 = widespread but with long term concerns SNR = not ranked; B = breeding rank; SNA = not resident in state in non-breeding season

Endangered, Threatened and Rare Species, and High Quality Natural Communities documented within one mile of the DuPont area, East Chicago, Indiana

SPECIES NAME	COMMON NAME	FED	STATE	TOWNRANGE	LASTOBS
Spermophilus franklinii	Franklin's Ground Squirrel		SE	036N009W 04 SEQ	7/27/1994
Papaipema leucostigma	Columbine Borer		ST	036N009W 03 NH SH	9/11/1990
Juglans cinerea	Butternut		WL	036N009W 03 SH	1989
Euchloe olympia	Olympia Marble		ST	036N009W 03 NH SH	4/25/1990
Wetland - marsh	Marsh		SG	036N009W 02 SWQ	1978-07
Papaipema pterisii	Bracken Borer Moth		WL	036N009W 03 NH SH	7/9/1992
Ophisaurus attenuatus	Slender Glass Lizard			036N009W 03 NH SH	1981-
Lycaeides melissa samuelis	Karner Blue	LE	SE	036N009W 03 SEQ	7/9/1992
Thamnophis proximus	Western Ribbon Snake		SSC	036N009W 03 SH	1991
Satureja glabella var. angustifolia	Calamint		SE	036N009W 03	1906-08
IVANHOE DUNE AND SWALE NATURE PRESERVE					
Emydoidea blandingii	Blanding's Turtle		SE	036N009W 02 SWQ SWQ NEQ	11/1/1991
Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	036N009W 02 NEQ	1978-07
Prairie - sand mesic	Mesic Sand Prairie		SG	036N009W 02 NEQ	7/23/1978
Prairie - sand wet	Wet Sand Prairie		SG	036N009W 02 NEQ	1978-07
Lake - pond	Pond		SG	036N009W 02 NEQ	7/23/1978
Prunus pensylvanica	Fire Cherry		SR	036N009W 02 NEQ	1985
Savanna - sand mesic	Mesic Sand Savanna		SG	036N009W 02 NEQ	7/23/1978
Ambystoma laterale	Blue-spotted Salamander		SSC	036N009W 02 NEQ	3/27/1991
Wetland - marsh	Marsh		SG	036N009W 02 NEQ	1978-07
Wetland - swamp shrub	Shrub Swamp		SG	036N009W 02 NEQ	1978-07
Platanthera hyperborea	Leafy Northern Green Orch		ST	036N009W 02 NEQ	1985
Juncus balticus var. littoralis	Baltic Rush		SR	036N009W 02 NEQ	1985
Problema byssus	Bunchgrass Skipper		ST	036N009W 02 NEQ	8/4/1995
Diervilla lonicera	Northern Bush-honeysuckle		SR	036N009W 02 NEQ	1985
Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	036N009W 02 NEQ	7/23/1978
Rhus aromatica var. arenaria	Beach Sumac		SR	036N009W 02 NEQ	1985
SEIDNER DUNE AND SWALE NATURE PRESERVE					
Peoria gemmatella	Gemmed Cordgrass Borer		SR	037N009W 33 SEQ	2001
Chlidonias niger	Black Tern		SE	037N009W 33 NH SEQ	7/11/1991
Juncus balticus var. littoralis	Baltic Rush		SR	037N009W 33 SWQ	2001
Ardea alba	Great Egret		SSC	037N009W 33 NEQ SEQ	6/10/1988
Cistothorus palustris	Marsh Wren		SE	037N009W 33 SEQ	6/6/1987
Semiothisa eremiata	The Goat's Rue Looper		SR	037N009W 33 SEQ	2001
Hesperia leonardus	Leonard's Skipper		SR	037N009W 33 SEQ	2001
Grammia oithona	Oithona's Grammia		SR	037N009W 33 SEQ	2001
TOLLESTON RIDGES NATURE PRESERVE					
Buteo lineatus	Red-shouldered Hawk		SSC	036N009W 03 NH SEQ	1978-08
Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slippe		SR	036N009W 03 NEQ	5/20/1987
Spiranthes lucida	Shining Ladies'-tresses		SR	036N009W 03 SEQ NWQ & SWQ NEQ	1989
Botaurus lentiginosus	American Bittern		SE	036N009W 03 NH	1975
Carex richardsonii	Richardson Sedge		ST	036N009W 03 SEQ NWQ & SWQ NEQ	1980
Carex aurea	Golden-fruited Sedge		SR	036N009W 03 SEQ NWQ & SWQ NEQ	8/11/1978
Prunus pensylvanica	Fire Cherry		SR	036N009W 03 SEQ NWQ & SWQ NEQ	1978-08

Fed: LE = federal endangered; LT = federal threatened; C = candidate

State: SE = state endangered; ST = state threatened; SR = state rare; WL = watch list; SX = state extirpated; SSC = species of special concern SG = state significant

Grank: Heritage Global Rank: G1 = critically imperiled; G2 = imperiled; G3 = rare or uncommon; G4 = widespread but with long term concerns; G5 = widespread and secure; GU = unranked

Srank: State Heritage Rank: S1 = critically imperiled; S2 = imperiled; S3 = rare or uncommon; S4 = widespread but with long term concerns SNR = not ranked; B = breeding rank; SNA = not resident in state in non-breeding season

12/6/200 Endangered, Threatened and Rare Species, and High Quality Natural Communities documented within one mile of the DuPont area, East Chicago, Indiana

SPECIES NAME	COMMON NAME	FED	STATE	TOWNRANGE	LASTOBS
Diervilla lonicera	Northern Bush-honeysuckle		SR	036N009W 03 SEQ NWQ & SWQ NEQ	8/10/1991
Wetland - marsh	Marsh		SG	036N009W 03 NH NH SEQ	1978-07
Solidago simplex var. gillmanii	Sticky Goldenrod		ST	036N009W 03 NWQ	8/11/1978
Emydoidea blandingii	Blanding's Turtle		SE	036N009W 03 SEQ NWQ	6/15/1986
Lycaeides melissa samuelis	Karner Blue	LE	SE	036N009W 03 CTR NH	7/29/1994
Wetland - swamp shrub	Shrub Swamp		SG	036N009W 03 SEQ SWQ NEQ & SWQ SEQ NEQ & NWQ NEQ SEQ	7/21/1978
Prairie - sand mesic	Mesic Sand Prairie		SG	036N009W 03 N HALF N HALF SEQ	7/21/1978
Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	036N009W 03 NH SEQ	7/21/1978
Spermophilus franklinii	Franklin's Ground Squirrel		SE	036N009W 03 NWQ	1978

Fed: LE = federal endangered; LT = federal threatened; C = candidate

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United States Department of the Interior
Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

December 20, 2004

Mr. Jon Parker, Project Manager
URS Corporation
335 Commerce Drive, Suite 300
Fort Washington Pennsylvania 19034

Dear Mr. Parker:

This responds to your letter of December 2, 2004 requesting endangered species information from the U.S. Fish and Wildlife Service (FWS) for a RCRA corrective action at the former DuPont site in East Chicago, Lake County, Indiana.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

Endangered Species

The proposed project is within the range of the federally endangered Indiana bat (*Myotis sodalis*) and Karner blue butterfly (*Lycaeides melissa samuelis*) and federally threatened bald eagle (*Haliaeetus leucocephalus*) and dune thistle (*Cirsium pitcheri*). There are no eagle nests or suitable dune thistle habitat at or near the project site. There is a small amount of Indiana bat summer habitat on the site, however there are no records of this species and its presence is unlikely due to the highly urban nature of the study area. There is a population of Karner blue butterflies inhabiting the Dupont property but this species is limited to suitable habitat (lupine plants and savannah), which occurs only in the dune and swale portion of the remnant natural area on the east end of the site. It is our understanding that no disturbance related to the RCRA action is proposed in that area.

There are no federal lands or federally designated natural areas on or adjacent to the site at this time. For additional information on endangered species please contact Mike Litwin at (812) 334-4261 ext. 205. Questions related to contaminant issues should be directed toward the FWS contaminants staff, which has participated in the RCRA process.

Sincerely yours,

for Scott E. Pruitt
Field Supervisor

cc: Paul Labus, The Nature Conservancy, Whiting, IN

APPENDIX D
Dose Rate Modeling Approach

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The purpose of this appendix is to present and describe development of several aspects of the dose rate modeling for wildlife receptors identified in the Baseline Ecological Risk Assessment (BERA) of the DuPont East Chicago Site located near East Chicago, Indiana. The following sections provide a detailed description of the development of species-specific exposure parameters, bioaccumulation factors (BAFs), area use factors (AUFs) and toxicity reference values (TRVs).

Simplified food web models were developed to calculate average daily doses (ADDs) of constituents of potential ecological concern (COPECs) that selected receptor groups experience through exposure to surface soil at the DuPont East Chicago Site. The ADD represents the dose of a chemical that a receptor may ingest if it foraged within designated exposure areas. ADDs for wildlife receptors are calculated using (1) exposure-point concentrations for prey and media developed for each exposure area, and (2) receptor-specific exposure parameters and food chain model assumptions. These ADDs can then be compared to toxicity reference values (TRVs), which represent no observable adverse effects levels (NOAELs) or lowest observable adverse effects levels (LOAELs). The following sections describe the calculation of ADDs including the derivation of exposure parameters, biota accumulation factors (BAFs) and area use factors (AUFs).

The dose rate modeling results for terrestrial exposure areas at the DuPont East Chicago Site are presented in Appendix F.

The simplified food web model considers the primary routes of exposure to wildlife receptors: the direct ingestion of prey and the incidental ingestion of soil. There were no water sources within the exposure areas evaluated, therefore water ingestion data were not included in the models. Chemical concentrations in prey are expressed as a function of chemical concentrations in soil using bioaccumulation factors (BAFs). Other important parameters in the model include, receptor body weight, food ingestion rate and an estimate of area use.

The total dose (ADD_{total}) experienced by each selected receptor is the sum of the doses obtained from the three primary routes of exposure:

$$ADD_{total} = ADD_{diet} + ADD_{substrate}$$

In the model, the total dose from each route of exposure is calculated individually as follows:

Dietary Dose:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (BAF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

where:

ADD_{diet}	= Dose of COPEC obtained from the diet (mg COPEC/kg receptor body weight-day)
IR_{diet}	= Ingestion rate of food (kg food ingested per day, dry weight)
BAF	= Bioaccumulation factor specific to prey type and COPEC (kg substrate/kg food, dry weight)
$C_{substrate}$	= COPEC concentration in substrate (mg COPEC/kg substrate, dry weight)
DF_i	= Dietary fraction of food item *i* (proportion of food type in the diet)
AUF	= Area use factor includes, when appropriate, seasonal use rates, area use rates, COPEC assimilation rate
BW	= Body weight of the receptor, wet weight (kg)

Substrate Dose:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

$ADD_{substrate}$	= Dose of COPEC obtained from drinking water (mg COPEC/kg receptor body weight-day)
IR_s	= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
$C_{substrate}$	= COPEC concentration in substrate (mg COPEC/kg substrate, dry weight)
AUF	= Area use factor includes, when appropriate, seasonal use rates, area use rates, COPEC assimilation rate
BW	= Body weight of the receptor, wet weight (kg)

The receptor dose of COPECs from diet and incidental substrate ingestion is modeled using dry weight parameters. To avoid introducing unnecessary uncertainty into the model by converting parameters from dry weight to wet weight based on approximate moisture contents of dietary items, model parameters for food ingestion rates, substrate ingestion rates, and substrate-to-biota accumulation rates are expressed on a dry weight basis.

The model includes parameters relating to receptor-specific exposure, bioaccumulation rates, bioavailability adjustments, and area use factors. The following sections describe the estimation of these parameters and the major assumptions of parameterization.

2.1 RECEPTOR-SPECIFIC EXPOSURE PARAMETERS

A BERA cannot specifically evaluate the potential for adverse effects to every plant, animal, and microbial species that may be present and potentially exposed in the area around the former Site and in downstream water bodies. As a result, receptors that are representative of high ecological or societal value, or those for which sufficient life history data are available and believed to be representative of broader groups of organisms, were selected as "receptors of concern (ROC)" for evaluation in the BERA.

Each species selected as a ROC reflects an assessment endpoint and considers trophic category and particular feeding behaviors (e.g., fish-eating birds versus worm-eating birds) that represent different modes of exposure to COPECs. Consequently, the species that were chosen for evaluation may represent several similarly exposed species in the area.

The following criteria were used to select potential receptors:

- The receptor does or could use habitats that are present around the Site;
- The receptor is important to either the structure or function of the ecosystem;
- The receptor is statutorily protected (i.e., threatened or endangered species, migratory birds) or is otherwise highly valued by society (i.e., species of cultural importance);
- The receptor is reflective and representative of the assessment endpoints for the Site area; and
- The receptor is known to be either sensitive or highly exposed to COPCs around the Site.

Terrestrial wildlife receptors selected to characterize exposure from historical operations at the DuPont East Chicago Site include:

- Herbivorous birds: Canada goose (*Branta canadensis*);
- Omnivorous birds: American robin (*Turdus migratorius*);
- Invertivorous birds: song sparrow *(Melospiza melodia);*
- Carnivorous birds: red-tailed hawk (*Buteo jamaicensis*);
- Herbivorous mammals: ground hog (*Marmota monax*)
  white-tailed deer (*Odocoileus virginianus*);
- Small invertivorous mammals: short-tailed shrew (*Blarina brevicauda*);
- Small omnivorous mammals: deer mouse (*Peromyscus maniculatus*); and
- Carnivorous mammals: red fox (*Vulpes vulpes*).

Exposure parameters used to determine the ADD for each receptor include body weight (kg, wet weight), food ingestion rate (kg dry weight/day), water ingestion rate (L/day), incidental substrate ingestion rate (kg dry weight/day), dietary composition, and area use factor. Typical

body weights for receptors were obtained from various literature sources for use in the models, and are provided in Table F-1 of Appendix F. Food ingestion rates were estimated as a function of body weight using allometric regression models developed by Nagy (2001) for various types of mammalian and avian receptors. Incidental substrate ingestion rates were obtained from Beyer et al. (1994) and Sample and Suter (1994). Dietary composition and area use information (i.e., typical home range) were obtained from literature sources, including USEPA (1993), Sample and Suter (1994), and various receptor-specific sources. Exposure information for each receptor species is summarized in Table F-1.

2.2 TERRESTRIAL BIOACCUMULATION FACTORS (BAFS)

Exposure-point concentrations in dietary items for terrestrial receptors are estimated using terrestrial bioaccumulation factors (BAFs). BAFs provide quantitative indicators of the tendency for a chemical to partition into terrestrial organisms relative to the concentrations present in terrestrial exposure media. BAFs used to calculate exposure-point concentrations of chemicals in terrestrial food items (terrestrial plants, soil invertebrates, and small mammals) were derived from the literature as indicated below. Terrestrial dietary concentrations based on BAFs and maximum concentrations in media are presented in Tables F-2 through F-19.

2.2.1 Plants

The concentrations of COPECs in terrestrial plants are estimated using the recommended applications of terrestrial plant bioaccumulation models developed by Efroymson et al. (2001). Single-variable regression models are the recommended application for general estimates of arsenic, cadmium, copper, lead, mercury, nickel, selenium, and zinc concentrations in plants (Efroymson et al. 2001). Regression model equations and input variables developed in Efroymson et al. (2001) are presented in the notes for Tables F-2 through F-19.

With the exception of antimony, uptake factors for vegetated portions of food crops reported in Baes et al. (1984) are used as BAFs for metals not evaluated in Efroymson et al. (2001). Concentrations of antimony in terrestrial plants are estimated using a single-variable regression model developed by USEPA (2003a). The regression model equation and input variables for antimony are presented in the notes for Tables F-2 through F-19. A conservative BAF of 1.0 es applied for any constituents for which BAFs were not available.

2.2.2 Soil Invertebrates

The concentrations of COPECs in soil invertebrates are estimated using the recommended applications of earthworm bioaccumulation models developed by Sample et al. (1999) and Neuhauser et al. (1995). Simple regression models are used to estimate soil invertebrate concentrations of arsenic, cadmium, copper, lead, mercury, manganese, selenium, and zinc; regression model equations and input variables are presented in the notes for Tables F-2 through F-19. The 90th percentile uptake factors reported in Sample et al. (1998a) are used to estimate soil invertebrate concentrations of chromium and nickel and median uptake factors are used to estimate soil invertebrate concentrations of aluminum, cobalt, iron, and silver (Sample et al. 1998a). A conservative BAF of 1.0 is assumed for uptake of these metals by soil invertebrates.

2.2.3 Small Mammals

The concentrations of constituents in small mammals are estimated using the recommended applications of small mammal bioaccumulation models developed by Sample et al. (1998b). General regression models are used to estimate concentrations of arsenic, chromium, iron, nickel, selenium, and zinc in small mammals (Tables F-2 through F-19). Trophic-group regressions are used to estimate concentrations of cadmium (omnivore), copper (insectivore), and lead (insectivore). Median general uptake factors are applied to soil concentrations of barium, cobalt, mercury, and thallium to estimate concentrations in small mammals (Sample et al. 1998b).

Small mammal concentrations of metals not evaluated in Sample et al. (1998b) (antimony, beryllium, manganese, silver, and vanadium) are estimated using uptake factors developed by Baes et al. (1984). The BAF from soil to small mammals is calculated as the product of the soil-plant concentration factor and the ingestion-beef transfer coefficient. This approach is similar to an approach used to estimate metal concentrations in small mammals for the development of ecological soil screening levels (USEPA 2003b).

2.3 AREA USE FACTORS (AUFS)

AUF values estimate the proportion of time a receptor would likely be actively foraging in each of the exposure areas associated with the DuPont East Chicago Site. For the preliminary exposure estimate, an AUF of 100% was used to calculate the ADD for each of the modelled receptors in order to provide the most conservative assumption. For a refined exposure estimate, an AUF less than 100% could be included in the calculation of the ADD in order to account for time spent foraging away from the exposure area. That is, the modelled receptors may or may not spend their entire time foraging in the exposure area because they may migrate, hibernate and/or their home ranges may be larger than the exposure area. The use of an AUF incorporates a more realistic assumption that reduces the overall uncertainty of the risk assessment, while retaining the conservative nature of the model.

2.4 TOXICITY REFERENCE VALUES (TRVS)

The dose-response relationships for COPECs are expressed as receptor-specific NOAEL- and LOAEL- based TRVs, which are defined as a daily ingested amount (mg/kg body weight-day) that is associated with a specified effect. Development of TRVs involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. Endpoints may be based on growth, reproductive, developmental, and survival effects. Such effects are important because they may affect the abundance or reproductive success of receptor populations. The NOAEL and LOAEL-based TRVs used to evaluate ADDs calculated in the model are presented in Table F-4; a detailed discussion of the derivation of the TRVs is provided in Appendix E.

There is inherent uncertainty in estimating the exposure of ecological receptors to COPECs in environmental media. Uncertainty in model parameters may result from a lack of knowledge of COPEC-specific bioaccumulation rates or site-specific exposure parameters. Model parameters that tend to overestimate, underestimate, or have an unknown effect on the estimation of exposure to ecological receptors are presented below with a discussion of their uncertainty.

3.1 EXPOSURE PARAMETERS

Exposure parameters in dose rate models represent typical physiological parameters reported in the literature for the selected receptors. These parameters are intended to be representative of typical populations of selected receptors, but may not be exactly representative of receptor populations inhabiting the Site and surrounding areas. For example, the availability (or lack) of site-specific forage or cover resources may increase or decrease the estimated home range of a receptor. An increased home range may result in decreased exposure, while a decreased home range may increase exposure. The availability of forage resources may also underestimate or overestimate the dietary composition included in the model, particularly for opportunistic foragers such as raccoon or red fox that may concentrate their diet on the food source that is abundant at a given time. Dietary composition may also vary seasonally with forage resource availability or specific dietary requirements (e.g., wood duck require a higher portion of invertebrates to satisfy protein requirements during the early spring molt and egg-laying).

Estimate ingestion rates of food, water, and substrate represent additional uncertainties in the dose rate models. As discussed in Section, 2.2.1, food ingestion rates are based on allometric regression equations developed by Nagy (2001). Nagy (2001) expanded on earlier models of food ingestion (Nagy 1987) by developing models for 90 different taxonomic, dietary, and habitat groupings of species. However, the average error rate of these models ranges from 5 to 60 percent depending on the group and may underestimate the feeding rates of free-living animals that are growing, reproducing, or storing up fat (Nagy, 2001). Estimated percentages of soil in the diet reported by Beyer et al. (1994) and other studies summarized in Sample and Suter (1994) were the primary sources of substrate ingestion rates used in the dose rate models. Actual site-specific substrate ingestion rates may vary by habitat and dietary components.

3.2 BIOACCUMULATION FACTORS

Site-specific measurements of tissue concentrations are the best data to reduce uncertainty in estimating exposure point concentrations in dietary components. However, the collection of tissue for all dietary components is not practical in most ecological risk assessments. Therefore, bioaccumulation factors or models must be applied and a level of uncertainty in estimated concentrations must be accepted.

As discussed in Sections 2.2 and 2.3, bioaccumulation factors provide quantitative indicators of the tendency for a chemical to partition into biological organisms relative to the concentrations present in environmental exposure media. The bioavailability of metals may be influenced by chemical and physical properties, such as their affinity to partition as soluble free ions, organic and inorganic complexes, precipitates of metal hydroxides, precipitates with insoluble organic complexes, or insoluble sulfide complexes. Metals may partition into these forms as a function of substrate-associated factors including organic carbon content, cation exchange capacity, pH, temperature, grain size, and acid-volatile sulfide content (in sediments). The complexity and

limited site-specific understanding of these interactions lead to uncertainties in estimating the bioaccumulation of metals from environmental media to biological organisms. The following sections evaluate the relative uncertainty associated with bioaccumulation factors and models selected to estimate dietary concentrations of metals for terrestrial and aquatic receptors.

3.2.1 Terrestrial Plants

Single-variable regression models developed by Bechtel (1998a) and USEPA (2003) create less uncertainty in estimating metal concentrations in plant tissue relative to estimations using single uptake factors. Single-variable regression models are developed from significant relationships determined between metal concentrations in surface soil and collocated aboveground plant tissue data obtained from a literature review of field and greenhouse studies (Bechtel 1998a). These models proved to be better than single uptake factors in estimating metal concentrations in plants and are recommended for general estimates (Bechtel 1998a). More uncertainty is associated with plant tissue concentrations of metals estimated using BAFs selected for from Baes et al. (1984), which are single uptake factors that do not consider changing rates of accumulation with varying soil concentrations.

3.2.2 Terrestrial Prey – Soil Invertebrates

Less uncertainty is associated with metal concentrations in soil invertebrates estimated using simple regression models developed by Bechtel (1998b) relative to estimates using single uptake factors. Bioaccumulation by earthworms is non-linear, decreasing with increasing soil concentrations (Bechtel 1998b). Uptake factors implicitly assume that accumulation is linear and constant across all soil concentrations, which may overestimate accumulation at higher soil concentrations. Therefore, less uncertainty is associated with soil invertebrate concentrations of arsenic, cadmium, copper, lead, mercury, manganese, selenium, and zinc, which were estimated using simple regression models recommended for general estimates (Bechtel 1998b). More uncertainty is associated with soil invertebrate concentrations of chromium, nickel and silver, which were estimated using median and 90th percentile uptake factors (Bechtel 1998b). The most uncertainty is associated with the bioaccumulation of antimony and thallium for which relevant bioaccumulation data were not available in the literature. Conservative default uptake factors of 1.0 are used for antimony and thallium, which creates substantial uncertainty associated with estimated concentrations of these elements in soil invertebrates.

3.2.3 Terrestrial Prey – Small Mammals

Metal concentrations in small mammal tissue estimated using the recommended bioaccumulation models for small mammals developed by Sample et al. (1998b) are less uncertain than estimated metal concentrations based on uptake factors. As with soil invertebrates, bioaccumulation by small mammals is non-linear, decreasing with increasing soil concentrations (Sample et al. 1998b). Uptake factors implicitly assume that accumulation is linear and constant across all soil concentrations, which may overestimate accumulation at higher soil concentrations. Therefore, less uncertainty is associated with small mammal concentrations of arsenic, cadmium, chromium, copper, lead, nickel, selenium and zinc, which were estimated using simple regression models recommended for general estimates (Sample et al. 1998b). Estimates of small mammal concentrations of barium, mercury and thallium are more uncertain than estimates

based on models because they were based on the median uptake factors reported in Sample et al. (1998b), which do not account for changing accumulation rates with changing soil concentrations.

The greatest uncertainty in estimating metal concentrations in small mammals is associated with uptake factors calculated from Baes et al. (1984). Uptake factors for antimony, beryllium, manganese, silver and vanadium were estimated as the product of the soil-to-plant uptake factor and the ingestion-to-beef uptake factor for each metal. In addition to the previously discussed uncertainty associated with single uptake factors, the use of these uptake factors assumes that all small mammals in the model are herbivorous. Sample et al. (1998b) indicates that bioaccumulation varies for many chemicals according to trophic level, with accumulation in insectivores typically exceeding accumulation in herbivores. Despite this uncertainty, uptake factors reported in Baes et al. (1984) have been used in the development of ecological soil screening levels (USEPA 2003b) and represent the best available bioaccumulation information for these metals.

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APPENDIX E
Development of Toxicity Reference Values for Dose Rate Models

1.0 Introduction

Eighteen inorganic chemicals have been identified as contaminants of potential ecological concern (COPECs) at the DuPont East Chicago Site: antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, zinc and cyanide. Four organic chemicals have been identified as COPECs: DDT, methoxychlor and aroclors 1254 and 1260.

TRVs for birds and mammals were selected from studies evaluating chronic effects on measurement endpoints that could have adverse effects on reproduction, development, growth, or, if no more relevant studies were available, mortality. The sequence of selection also followed the order reproduction> development> growth> mortality. Short-term tests were not considered unless they occurred during development and no longer-term data were available, and single dose tests were not considered because there was no way of estimating where on a dose-response curve the data fit. In the following sections, the number of studies evaluated reflects those studies that met these criteria. Because a large number of tests were evaluated, only the data from the selected test is discussed in detail. When a single test was judged to be superior to all others, this test was selected for TRV development, but when several studies were judged to be of similar quality, the geometric mean for the study endpoints was selected for the TRV. Both NOAEL- and LOAEL-based TRVs were derived. Both endpoints were usually derived from the same study, but in cases where this was not possible or a different study provided superior information separate studies were used as the basis for the NOAEL and LOAEL. There were instances where only a NOAEL or only a LOAEL was available and an extrapolation factor was required to estimate one from the other. U.S. EPA has traditionally assumed a 10-fold difference between the NOAEL and the LOAEL, but these are based on arbitrary safety factors first published by Lehman and Fitzhugh (1954) at a time when only very limited toxicity data was available. However, Weil and McCollister (1963) examined the ratios of LOAELs to NOAELs from 27 subchronic and 25 chronic studies and reported that all the subchronic and 23 of the 25 chronic studies had LOAEL to NOAEL factors of 5 or less. The remaining two studies had ratios of 10 or less. Combining the data from all studies, 95 percent (50 of 52) resulted in a ratio of 5 or less. Lewis et al. (1990) considered that even these ratios were overestimates because the LOAEL is almost always an overestimate of the lowest effect level (LAEL, derived from a study of an infinitely large number of individuals) and the NOAEL almost always underestimates the no effect level (NAEL). The margins by which the LAEL and NAEL are mis-estimated are governed by the scale and design of the study and smaller numbers and more widespread of dose groups and smaller numbers of animals lead to larger misestimates. The net effect of these two mis-estimates is a multiplicative increase in overestimation of the LOAEL-to-NOAEL ratio. Lewis et al. (1990) concluded that a factor of 5 accounts for this difference in 96 percent of the experiments. Therefore, where necessary, a factor of 5 was used to convert between a NOAEL and a LOAEL, (e.g., LOAEL= NOAEL*5).

For a variety of reasons including budget constraints in testing protocols, many NOAELs are well below the next higher dose that caused an adverse effect, the LOAEL. Likewise, it is unlikely that the LOAEL is the actual lowest dose that would potentially cause an adverse effect. This is because only so many doses can be tested and these doses are often separated by 10-fold differences in concentration. Therefore, there is a scientific "grey zone" between the experimentally derived NOAEL and LOAEL such that the real NOAEL is probably higher and the real LOAEL is probably lower than the results of the testing indicate. However, while the NOAEL is assumed, the LOAEL is actually measured, (i.e. there is an adverse effect documented). Therefore, when the interval between doses and the adverse effects is not too great, more credence should be given to the LOAEL than the NOAEL. In fact, since the NOAEL has no biological effects, it is only an indication of the absence of risk and should not be used for risk management decisions.

2.0 Birds

2.1 Metal Inorganics

2.1.1 Antimony

No acceptable toxicity studies were identified for the effects of antimony on avian receptors for this risk assessment.

2.1.2 Arsenic

For selection of the NOAEL and LOAEL, three studies were evaluated. The NOAEL selected for arsenic was based on a study by Stanley et al. (1994). Stanley et al. (1994) fed breeding mallards arsenic in the form of sodium arsenate for 4 weeks prior to pairing and through multiple hatching cycles. In adults, no adverse effects were found on egg weight, or duckling production at a dose of 5.5 mg As/kg BW/day. The LOAEL from the same study was 22 mg As/kg BW/day.
NOAEL = 5.5 mg As/kg BW/day
LOAEL = 22 As/kg BW/day
Other studies used shorter exposure periods and non-reproductive endpoints (Camardese et al. 1990; Kerr et al. 1963).

2.1.3 Barium

Based on work by Johnson et al. (1960), Sample et al. (1996) calculated a NOAEL of 208.3 and a LOAEL of 416.5 mg Ba/kg BW/day.

2.1.4 Boron

Based on a study by Smith and Anders (1989) using mallard ducks, Sample et al. (1996) calculated a NOAEL of 28.8 and a LOAEL of 100 mg/kg BW/day.

2.1.5 Cadmium

For selection of the NOAEL and LOAEL, four studies were evaluated. The NOAEL for cadmium is based on results reported by White and Finley (1978). White and Finley

(1978) fed mallards cadmium (as cadmium chloride) for 90-days during the reproductive phase and found no adverse effect on body weight, food consumption, egg production or blood parameters commonly associated with cadmium intoxication at a dose of 1.9 mg Cd/kg BW/day. The LOAEL from this study was 21.1 mg Cd/kg BW/day. Other studies resulted in similar NOAELs (Leach et al. 1979), similar conclusions when the NOAEL was estimated by dividing the LOAEL ten-fold (Cain et al. 1983), or examined non-reproductive endpoints (White et al. 1978). The NOAEL from the Cain et al. (1983) study is 2.1 mg Cd/kg BW/day (for renal lesions, a more sensitive endpoint for cadmium exposure than reproduction). Therefore the reproductive results from the White and Finley (1978) study were used as the basis for the NOAEL and LOAEL:
TRVNOAEL = 1.9 mg Cd/kg BW/day
TRVLOAEL = 21.1 Cd/kg BW/day

2.1.6 Chromium

There are two major forms of chromium in ore, CrIII and CrVI. CrVI is a powerful oxidant that some studies show to be more toxic than CrIII. However, once ingested, the conditions in the stomach convert CrVI to CrIII, and CrIII is so poorly absorbed it has been used as a fecal marker. U.S. EPA (2005) performed a comprehensive review of the available avian studies with chromium and determined there were insufficient studies to estimate a NOAEL or LOAEL for CrVI. NOAELs for CrIII ranged from 0.238 to 37.7 mg Cr/kg BW/day for reproduction and from 0.483 to 359 mg /kg BW/day for growth. Only two studies reported both NOAEL and LOAEL values. Haseltine et al. (unpublished) reported NOAELs and LOAELs that result in a geologically impossible NOEC soil concentrations and an LOEC soil concentration roughly equivalent to normal ambient soil concentrations. Therefore, this study was not considered. Meluzzi et al. (1996) evaluated an unusual toxicity endpoint, albumin weight, but reported environmentally reasonable doses. Furthermore, EPA (2005) gave this study the highest evaluation score of all the available studies for all endpoints, and egg albumin is a measure of reproductive performance. Therefore, this study was selected as the basis for the TRVs for chromium. Meluzzi et al. (1996) fed adult chickens 0, 500, 100, and 2000 mg chromium chloride/kg diet for fifteen days during ovulation and only reported adverse effects at the highest concentration. U.S. EPA (2005) calculated the NOAEL and LOAEL doses based on a body weight of 1.6 kg and an ingestion rate of 0.136 kg/kg BW/day. Therefore, the best available NOAEL for chromium is:
TRVNOAEL = 37.7 mg CrIII/kg BW/day,
and the best available LOAEL is:
TRVLOAEL = 75.4 mg CrIII/kg BW/day.
Other studies did not provide both NOAEL and LOAEL doses and resulted in geologically implausible soil concentrations (EPA 2005). Furthermore, a recent study by Ahmad et al. (2004) concluded that concentrations as high as 8000 mg CrIII/kg had no effect on body weights when fed for 28-days.

2.1.7 Cobalt

The form of cobalt used in both mammalian and avian bioassays, $CoCl_2$, is highly bioavailable, as are $CoSO_4$, $CoCO_3$, and $CoNO_3$. CoO is less bioavailable (Miles and Henry 2000). No information is available concerning the bioavailability of CoS, the most

likely form of cobalt found under reducing conditions. The avian ECO-SSL for cobalt is based upon a NOAEL of 7.61 mg Co/kg BW/day (U.S. EPA 2005). Applying the NOAEL-LOAEL conversion factors of 5 (Lewis et al. (1990), this produces a LOAEL of 38.1 mg Co/kg BW/day.

2.1.8 Copper

For selection of the NOAEL and LOAEL, five studies were evaluated. The NOAEL for copper is based on a study by Mehring et al. (1960), which was considered the most relevant study because of its longer exposure duration. Mehring et al. (1960) exposed 1-day old chicks to 37, 52, 74, 104, 208, 294, 403, 570, 749, or 1180 mg Cu/kg food for 10 weeks and reported that a dose of 33 mg Cu/kg BW/day caused no adverse effect, while 62 mg Cu/kg BW/day EL inhibited growth.
NOAEL = 33 mg Cu/kg BW/day
LOAEL = 62 mg Cu/kg BW/day

The other studies reviewed resulted in similar NOAELs (Norvell et al. 1975, Underwood 1956, Bakalli et al. 1995), or were confounded by gizzard erosion due to the copper salt used (Jensen and Maurice (1978).

2.1.9 Lead

For selection of the NOAEL and LOAEL, three studies were evaluated. The NOAEL selected for lead is based on a study by Kendall and Scanlon (1981) because it addressed reproductive endpoints and produced a scientifically plausible "safe" soil concentration. Other studies reported effect doses that are so low they cannot be used for risk management (Edens et al. 1976; Edens and Garlich 1983) because back-calculated "safe" soil concentrations (i.e.~ 0.05 mg Pb/kg) are lower than lead concentrations commonly reported in naturally occurring soils.

Kendall and Scanlon (1981) exposed doves to 100 mg Pb/L as lead acetate for 2-weeks and reported no adverse effects on egg production, egg fertility, or hatch weight at a dose of 7.42 mg Pb/kg BW/day. No LOAEL value is available, but was estimated by multiplying the NOAEL by 5 (Lewis et al. 1990).
NOAEL = 7.4 mg Pb/kg BW/day
LOAEL = 37 mg Pb/kg BW/day

2.1.10 Manganese

Based on work by Laskey and Edens (1985), Sample et al. (1996) from ORNL calculated a NOAEL of 977 mg Mn/kg BW/day. Applying the NOAEL-LOAEL uncertainty factor of 5 (Lewis et al. 1990), this is a LOAEL of 4,885 mg Mn/kg BW/day.

2.1.11 Mercury

Only one study for mercury that used a reproductive endpoint was found. Hill and Schaffner (1976) fed Japanese quail a dose of 0.45 mg Hg/kg BW/day for 1 year and looked at the reproductive cycle. They found no adverse effects on egg production, fertility, or hatchability of the eggs produced. The LOAEL from this study was 0.91 mg Hg/kg BW/day.

NOAEL = 0.45 mg Hg/kg BW/day
LOAEL = 0.91 mg Hg/kg BW/day

2.1.12 Nickel

For selection of the NOAEL and LOAEL, four studies were evaluated. The NOAEL for nickel is based on a study by Eastin and O'Shea (1981) that used reproductive endpoints. Other studies examined non-reproductive endpoints (Cain and Pafford 1981) or used shorter exposure durations (Nielsen 1977; Weber and Reid 1968).
Eastin and O'Shea (1981) fed day-old mallard ducklings 0, 12.5, 50, 200, or 800 mg Ni/kg food for 90 days and reported no adverse effects on egg production, hatchability, or survival of ducklings at a dose of 79.8 mg Ni/kg BW/day (NOAEL). No LOAEL value is available for reproduction from this study, but the Cain and Pafford (1981) study reported a LOAEL of 107 mg Ni/kg BW/day.
TRVNOAEL = 80 mg Ni/kg BW/day
TRVLOAEL = 107 mg Ni/kg BW/day

2.1.13 Selenium

The avian TRV (NOAEL=0.4 mg/kg BW/day and LOAEL=0.8 mg/kg BW/day) for birds exposed to selenium is based on a series of studies on mallard ducks by Heinz and others. Heinz et al. (1989) reported that adult mallards suffered reduced reproductive success when fed a diet containing 8 mg SeM/kg, but that no effects were found at 4 mg SeM/kg. The resulting NOAELs and LOAELs were calculated by Sample et al. (1996) as 0.4 and 0.8 mg SeM/kg BW/day, respectively.
NOAEL = 0.4 mg Ni/kg BW/day
LOAEL = 0.8 mg Ni/kg BW/day

2.1.14 Thallium

No avian toxicity data for thallium was found.

2.1.15 Vanadium

Based on work by White and Dieter (1978), Sample et al. (1996) calculated an avian NOAEL of 11.38 mg V/kg BW/day. Applying the NOAEL-LOAEL uncertainty factor of 5 (Lewis et al.1990), this produced a LOAEL of 56.9 mg V/kg BW/day.

2.1.16 Silver

For selection of the NOAEL and LOAEL, three avian studies were evaluated. The NOAEL for silver is based on a study by Jensen et al. (1974) that evaluated weight gain. Other studies were conducted for shorter exposure durations (Hill et al. 1964) or only reported adverse effects at higher concentrations (Peterson and Jensen 1975).
Jensen et al. (1974) exposed turkeys to 100, 300, 0r 900 mg Ag/kg food (as silver nitrate) for 35-days. They reported no adverse effects at the lowest concentration but decreased weight gain at the next highest concentration. Assuming the poults weighed 65 g, and estimating the food ingestion rate using the Nagy (2001) allometric equation for galliform birds, this is a NOAEL of 14.5 mg Ag/kg BW/day and a LOAEL of 43.6 mg Ag/kg BW/day.
NOAEL = 14.5 mg Ag/kg BW/day

LOAEL = 43.6 mg Ag/kg BW/day

2.1.17 Zinc

For selection of the NOAEL and LOAEL, three studies were evaluated. The NOAEL selected for zinc is based on a study by Stahl et al. (1990). Stahl et al. (1990) fed 48, 228, or 2028 mg Zn/kg food to adult leghorn chickens for 44 weeks. They found no adverse effect on hatchability as measured by fertility, egg hatchability, and body mass of 3-week old progeny at a dose of 14.5 mg Zn/kg BW/day. A slight decrease in hatchability was found at 131 mg Zn/kg BW/day.
NOAEL = 14.5 mg Zn/kg BW/day
LOAEL = 131 mg Zn/kg BW/day
The other studies reviewed resulted in reported similar NOAEL doses (Jackson et al. 1986) or examined shorter exposure durations (Gasaway and Buss 1972).

2.2 Non-Metal Inorganics (Cyanide)

There are only two reports of chronic toxicity tests for effects of cyanide on birds. Eisler (1999) summarized that the NOEC for growth in chicks was 103 mg FCN/kg diet (Hill and Henry 1996), but 135 mg FCN/kg diet resulted in growth reduction (Eisler 1991). These are chronic NOAELs and LOAELs of 5.4 and 7.0 mg FCN/kg BW/day, respectively. According to Eisler et al. (1999), however, chickens, are a cyanide-tolerant species, so these TRVs must be adjusted to reflect what little is known about the sensitivity of species more closely related to those found at DuPont East Chicago. The mallard duck is the most sensitive avian species for which acute toxicity is available. Henny et al. (1994) demonstrated a NOAEL of 0.52 mg Cn/kg BW/day and a LOAEL of 0.68 mg Cn/kg BW/day.
NOAEL = 0.52 mg Cyanide/kg BW/day
LOAEL = 0.68 mg Cyanide/kg BW/day

2.3 Organic Chemicals

2.3.1 DDT

With the exception of the USNW (1998) TRVs, none of the published TRV values consider the range over which toxicity may occur in different species. With respect to t-DDT (p,p'-DDT, p,p'-DDE, and p,p'-DDD), this is particularly important because t-DDT has very different effects on different birds species. The USNW (1998) provides an estimate for the most sensitive (brown pelican) as well as a less sensitive representative species (mallard duck).

The TRV-H was based on studies conducted by Heath et al. (1969). These researchers fed mallard duck diets containing DDT and DDE for two years and analyzed reproductive success. The endpoints analyzed were percent cracked eggs, embryo mortality, hatchling survival, and number of ducklings per hen. The LOAEL for DDE was 0.6 mg DDE/kg BW/day. Since this study provided a chronic LOAEL, USNW (1998) did not divide by any uncertainty factors.

U.S. EPA (1995), Sample et al. (1996), and USNW (1998) all rely on a single field study to set the TRV-L. The TRV-L was taken from a study of reproductive success of brown pelican (*Pelecanus occidentalis*) nesting on Anacapa Island, offshore from Santa Barbara, California, in the late 1960's. Based on previous studies that showed a population decline, (it was assumed that this was due to t-DDT alone), Anderson et al. (1975) reported concentrations of t-DDT in pelican eggs and in their major source of food, the Northern anchovy (*Engraulis mordax*). During the period of study (1969-1974), the concentration of t-DDT in anchovy decreased and the fledging success rate began to increase. In 1974, the estimated dose of t-DDT to young birds was 0.028 mg t-DDT/kg BW/day.

The dose estimated from Anderson et al. (1969) was considered a LOAEL by Sample et al. (1996) and U.S. EPA (1995), and the basis of the TRV-L by USNW (1998). Sample et al. (1996) estimated the NOAEL by dividing this LOAEL by a factor of ten (i.e., 0.0028 mg DDE/kg BW/day). However, the U.S. EPA (1995) considered that since the pelican appears to be one of the most sensitive species analyzed and because the Anderson et al. (1975) study was chronic, that an uncertainty factor of ten was not justified. Rather, since the fledging rate was depressed by about 30%, they applied an uncertainty factor of three. This yielded a NOAEL of 0.009 mg DDE/kg BW/day. However, this dose was estimated by using the Nagy (1987) allometric equation for marine birds and a more recent analysis for Pelicaniformes is now available (Nagy 2001). Re-analysis of the Anacapa Island field data using the new equation yields a LOAEL dose of 0.059 mg t-DDT/kg BW/day , or a NOAEL of 0.02 mg t-DDT/kg BW/day.

The brown pelican is the most sensitive avian species yet analyzed for adverse effects of DDE (Blus 1996) and, since brown pelicans do not nest in Indiana, the TRV for the brown pelican must be modified before it can be used for site-specific ROCs. This may be accomplished by the use of interspecies uncertainty factors:

$$TRV_{Species}\ X = TRV_{Brown\ Pelican} \times UF_{Interspecies}.$$

The actual cause of reproductive failure in birds ingesting t-DDT is p,p'-DDE, a metabolic breakdown product. This metabolic product causes birds to produce eggshells that are thinner and more susceptible to breakage by the parents. A reproducible relationship has been shown between the concentration of p,p'-DDE and the degree of eggshell thinning. Cade (1970), Blus (1972), Henny et al. (1984), and Mendenhall et al. 1983) have shown that the base-10 logarithm of the wet weight concentration of DDE in peregrine falcon, brown pelican, black-crowned night heron, and barn owl eggs is very well correlated with eggshell thickness (Table A-1; Figure A-2). In addition, Spitzer et al. (1978) reported an equation for osprey which relates eggshell thinning to log dry weight [DDE]. Significant regressions for the mallard (Haegele and Hudson, 1974), black duck (Longcore et al. 1971; Longcore and Stendell 1977), and great blue heron (Fitzner et al. 1988) log egg DDE concentrations and eggshell thickness were also derived from the available literature (Table A-1; Figure A-2).

Figure A-2. Relationship Between Percentage Decrease in Eggshell Thickness and Egg [DDE] in Six Species of Birds

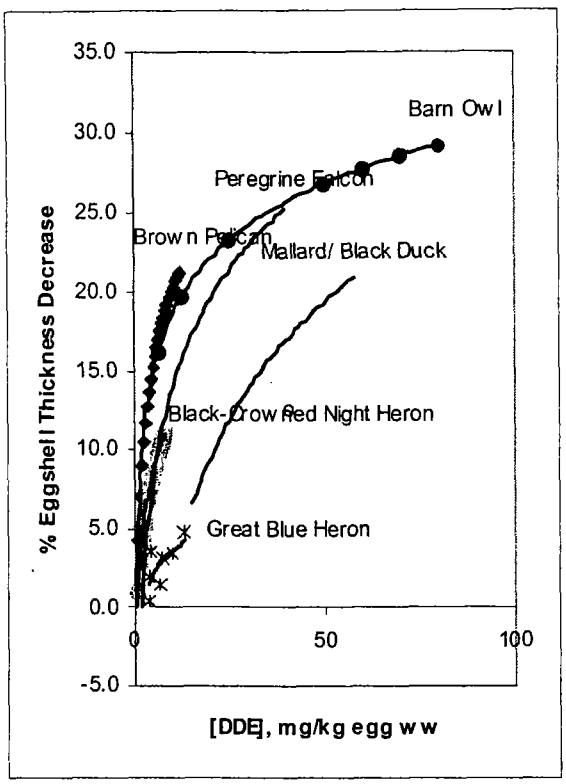

Table A-1. Equations Used to Estimate Percentage Eggshell Thinning (y) from Egg [DDE].

Species	Equation
Barn owl	y= 5.1256*ln [DDE] + 6.7138, r2= 1.0
Brown pelican	y= 6.596 * ln [DDE] + 4.6213; r2=0.9979
Peregrine falcon	y= 8.2873* ln [DDE]- 5.3192; r2= 1.0
Osprey	y=501-18.2*ln[DDE]; F= 8.2
Mallard and black duck	y= 10.715* ln [DDE] - 22.651; r2= 0.9808
Black-crowned night heron	y= 4.7378 * ln [DDE] + 1.0909; r2 = 1.0
Great blue heron	y= 2.068 ln [DDE] - 1.1159; r2= 0.4961; p=.066

From these equations, it is possible to estimate species-specific TRVs from the pelican and mallard data by normalizing the concentrations of DDE that cause similar adverse effects. Table A-2 shows the concentrations of DDE in eggs that are associated with a 20% reduction in eggshell thickness. It may be seen from Figure A-2 and Table A-2 that a 20% decrease in eggshell thickness occurs at a lower whole egg DDE concentration in brown pelican than in, for instance, black-crowned night heron. In fact, it takes approximately 5.24-times (Table A-2) as much DDE to cause a similar degree of adverse effect in black-crowned night heron as in brown pelican.

Table A-2. Concentrations of DDE causing 20% reduction in eggshell thickness and interspecies sensitivity factors in seven species of birds.

Species	[DDE] (mg/kg egg ww)	Sensitivity Factor (compared to Anderson 1975 pelican study)	Sensitivity Factor (compared to Heath et al. 1969 mallard study)
Brown pelican	10.5	1	0.19
Barn owl	13.5	1.29	0.25
Peregrine falcon	21.5	2.05	0.40
Osprey	41.0	3.91	0.76
Mallard/ Black duck	54.0	5.14	1.00
Black-crowned night heron	55.0	5.24	1.02

Therefore, as an example, it is possible to extrapolate a species-specific TRVNOAEL for the black-crowned night heron from the brown pelican low TRV:

NOAELBlack-crowned night heron = 0.02 mg DDE/kg food/day x 5.24 = 0.105 mg DDE/kg food/day.

Similarly, species-specific high TRVs may be estimated from the high TRV for mallard duck. In this case, most species are more sensitive than mallard duck. Therefore, the species-specific TRVLOAEL for the osprey is:

LOAELOsprey = 0.6 mg DDE/kg food/day x 0.76 = 0.46 mg DDE/kg food/day.

Other species-specific TRVs may be estimated using the same technique (Table A-3). These LOAEL and NOAEL TRV estimates can be used without adjustment for body size or any additional uncertainty factors. Mineau et al. (1996), Fischer and Hancock (1997), and Sample and Arenal (1999) have all analyzed the toxicity data for pesticides and concluded scaling for differences in body size is unwarranted for birds. No other uncertainty factors are required because both the pelican and mallard duck studies were chronic in nature. These LOAEL and NOAEL TRV estimates incorporate an extrapolation factor based upon sensitivity to egg shell thinning and show the range of possible TRVs, depending upon whether the pelican field-derived study (Anderson 1975) or the mallard laboratory study (Heath et al. 1969) is most appropriate for the site-specific receptors and exposure pathways.

There are no studies of the effects of t-DDT on either bald eagle or kingfisher. However, the black-crowned night heron and belted kingfisher are evolutionarily primitive and physiologically similar in that all are piscivorous. Therefore, the TRVs for black-crowned night heron will be used for the belted kingfisher. Similarly, the osprey and eagle are similar physiologically, so that the TRV for the osprey is a reasonable surrogate for the eagle.

There are no controlled toxicity studies of the effects of DDXs on American robin. However, Gill et al. (2003) reported egg DDXs, eggshell thickness, and nest success rates for orchards in British Columbia. They reported no adverse effect on either eggshell thickness or fledge rate at a mean egg DDX concentration of 96.07 mg/kg, wet weight. Since a concentration of 60 mg DDX/kg egg was associated with a 20% decrease in mallard eggshell thickness, American robin are at least 20% less sensitive than the mallard duck . Table A-3 shows the NOAEL and LOAEL TRVs for the avian ROCs.

Table A-3. TRVs for American Robin, Bald Eagle, and Belted Kingfisher.

Species	TRVNOAEL	TRVLOAEL
American Robin	3.0 mg DDE/kg BW/day	> 3.0 mg DDE/kg BW/day
Bald Eagle	0.078 mg DDE/kg BW/day	0.46 mg DDE/kg BW/day
Belted kingfisher	0.105 mg DDE/kg BW/day	0.6 mg DDE/kg BW/day

2.3.2 Methoxychlor

Smith (1991) conducted a study of the reproductive effects of methoxychlor in chickens, and demonstrated no reproductive effects after 8 – 16 weeks at dietary levels as high as 145 mg/kg BW/day. Applying the NOAEL-LOAEL conversion factor (Lewis et al. 1990), a LOAEL of 725 mg/kg BW/day was calculated. Therefore:
NOAEL = 145 mg/kg BW/day
LOAEL = 725 mg/kg BW/day
Acute studies reported oral dose LD50 values of greater than 2000 mg/kg in mallards, grouse and quail (Hudson et al 1984) and greater than 5000 mg/kg in quail and pheasants (Kidd and James 1991).

2.3.3 Aroclors 1254 and 1260

Based on a study by Dahlgren et al. (1972) using ring-necked pheasants, Sample et al. (1996) calculated a NOAEL of 0.18 and a LOAEL of 1.8 mg/kg BW/day for aroclor 1254. A NOAEL of 0.18 and a LOAEL of 1.8 mg/kg BW/day was used for both aroclor 1254 and aroclor 1260.

2.4 Summary of Avian TRVs

The following table summarizes avian NOAEL and LOAEL TRVs.

Parameter	NOAEL-TRV (mg/kg BW/day)	LOAEL-TRV (mg/kg BW/day)
Antimony	NA	NA
Arsenic	5.5	22
Barium	208.3	416.5
Boron	28.8	100
Cadmium	1.9	21.1
Chromium	37.7	75.4
Cobalt	7.61	38.1
Copper	33	62
Lead	7.4	37
Manganese	977	4,885

Mercury	0.45	0.91
Nickel	80	107
Selenium	0.4	0.8
Thallium	NA	NA
Vanadium	11.38	56.9
Silver	14.5	43.6
Zinc	14.5	131
Cyanide	0.52	0.68
DDT	3.0	15
Methoxychlor	145	725
Aroclor 1254	0.18	1.8
Aroclor 1260	0.18	1.8

3.0 Mammals

3.1 Metal Inorganics

3.1.1 Antimony

The mammalian ECO-SSL for antimony is based on the highest bounded NOAEL below the lowest bound LOAEL, a dose of 0.06 mg Sb/kg BW/day (U.S. EPA 2005). However, this results in an ECO-SSL soil concentration of 0.29, which is far lower than the concentration normally found in soils. Therefore, the geometric mean NOAEL, 13.3 mg Sb/kg BW/day was used as the TRV. Applying the NOAEL-LOAEL conversion factor of 5 (Lewis et al. 1990), a LOAEL of 66.5 mg Sb/kg BW/day was produced.

3.1.2 Arsenic

For selection of the NOAEL and LOAEL TRVs, three studies were evaluated. No adverse effects on reproduction were found in any study evaluated. The NOAEL selected is based upon the studies by Neiger and Osweiller (1989) and Byron et al. (1967). Byron et al. (1967) showed no decrease in growth in rats fed a dose of 5.7 mg As/kg BW/day, but found a slight decrease at 11.6 mg As/kg BW/day. However, the LOAEL may be an artifact of food acceptance since Neiger and Osweiller (1989) reported that, in dogs, the weight loss observed as the dominant effect of arsenic ingestion was due to a failure to feed at food arsenic concentrations greater than 4 mg As/kg diet. However, in the absence of other data, these values will be used as the NOAEL and LOAEL:

TRVNOAEL = 5.7 mg As/kg BW/day

TRVLOAEL = 11.6 mg As/kg BW/day.

The third study evaluated only examined a single no effect dose of arsenic administered in the drinking water (Schroeder et al. 1968).

3.1.3 Barium

The mammalian ECO-SSL for barium is based on a NOAEL of 51.8 mg Ba/kg BW/day (U.S. EPA 2005). Applying the NOAEL-LOAEL conversion factor of Lewis et al. (1990), this produced a LOAEL of 259 mg Ba/kg BW/day.

3.1.4 Boron

Based on a study by Weir and Fisher (1972) using rats, Sample et al. (1996) calculated a NOAEL of 28 and a LOAEL of 93.6 mg/kg BW/day.

3.1.5 Cadmium

U.S. EPA (2005) evaluated 34 studies of cadmium effects on reproduction in mammals. U.S. EPA used the geometric mean of the NOAELs from these studies as the recommended NOAEL, which was 5.1 mg Cd kg BW/day; the geometric mean of the LOAELs from these studies is 7.1 mg Cd/kg BW/day.
TRVNOAEL = 5.1 mg Cd/kg BW/day
TRVLOAEL = 7.1 mg Cd/kg BW/day

3.1.6 Chromium

For selection of the NOAEL and LOAEL TRVs, five studies of CrIII were evaluated; however, no studies with reproductive endpoints that meet all of the criteria for TRV development were identified. The NOAEL selected is based on a study by Anderson et al. (1997). Anderson et al. (1997) exposed rats to 0, 5, 25, 50, or 100 mg CrIII/kg for 20-weeks and reported no adverse effects on body weight, blood variables (i.e., organ enzyme biomarkers), or renal or hepatic weights or histology at the highest concentration tested, a dose of 15 mg Cr/kg BW/day. This value was selected as the NOAEL. No LOAEL is available from this or other studies, so the LOAEL was estimated from the NOAEL by multiplying the NOAEL by a factor of 5 (Lewis et al. 1990).
TRVNOAEL = 15 mg CrIII/kg BW/day
TRVLOAEL = 75 mg CrIII/kg BW/day
Other studies that were evaluated used water, alkali, and acid-insoluble chromium salts (Ivankovic and Preussmann 1975) and have been discounted by U.S. EPA (1998) due to: a) lack of dose-response information and insufficient detail to allow reconstruction of actual doses (Elbetieha and Al-Hamood 1997), b) reported biologically-implausible conclusions based on questionable statistical analyses (Zahid et al. 1990), or c) conflicting reports from very similar experiments (Bataineh et al. 1977; Al-Hamood et al. 1998).

Ten studies of CrVI were evaluated. The NOAEL is based on studies by Junaid et al. (1996), Kanojia et al. (1996) and Kanojia et al. (1998). Junaid et al. (1996), Kanojia et al. (1996) and Kanojia et al. (1998) exposed mice and rats to 0, 250, 500, or 750 mg potassium chromate/L for 20-to-90 days prior to gestation and reported adverse effects on fetal weight and pre- and post-implantation at 37 to 67 mg CrVI/kg BW/day for rats and mice, respectively. The lowest LOAEL from this study (37 mg CrVI/kg BW/day) was divided by a factor of 5 to estimate the NOAEL.
TRVNOAEL = 7.4 mg CrVI/kg BW/day
TRVLOAEL = 37 mg CrVI/kg BW/day
Other studies examined lower no effect doses (MacKenzie et al. 1958, Anwar et al. 1961; Chowdhury and Mitra 1995) and were discounted by U.S. EPA (1998) for the reasons already discussed. Since the TRVs for CrVI are lower than those for CrIII, these were used in order to take a conservative approach.

3.1.7 Cobalt

The form of cobalt used in both mammalian and avian bioassays, $CoCl_2$, is highly bioavailable, as are $CoSO_4$, $CoCO_3$, and $CoNO_3$. CoO is less bioavailable (Miles and Henry 2000), and no information is available concerning the bioavailability of CoS, the most likely form found in ore bodies. The mammalian ECO-SSL for cobalt is 240 mg Co/kg, based on a NOAEL of 7.34 mg Co/kg BW/day (U.S. EPA 2005). Applying the NOAEL-LOAEL conversion factor of Lewis et al. (1990), this produced a LOAEL of 36.7 mg Co/kg BW/day.

3.1.8 Copper

For selection of NOAEL and LOAEL TRVs, seven studies were evaluated. The NOAEL selected for copper is based on results reported by Aulerich et al. (1982). Aulerich et al. (1982) fed copper sulfate to mink for 357-days and found no adverse effects on reproduction at a dose of 11.7 mg Cu/kg BW/day. The LOAEL from this study was 15.1 mg Cu/kg BW/day.
TRVNOAEL = 11.7 mg Cu/kg BW/day
TRVLOAEL = 15.1 mg Cu/kg BW/day
Other studies reached a similar NOAEL (Massie and Aiello 1984), examined non-reproductive endpoints (Pocino et al. 1991, Boyden et al. 1938, Llewellyn et al. 1985, Murthy et al. 1981) or were conducted for shorter exposure durations (Lecyk et al. 1980).

3.1.9 Lead

For selection of NOAEL and LOAEL TRVs, six studies were evaluated. The NOAEL selected for lead was based on the study by Kimmel et al. (1980). In this study rats exposed for 312 days (throughout conception and delivery) to 0, 0.5, 5, 25, 50, or 250 mg Pb/L (as lead acetate) showed no adverse effects on conception, gestation length, delivery, birth weight or pup survival at the highest concentration tested. The highest concentration (250 mg Pb/L) is equivalent to a dose of 34 mg Pb/kg BW/day. This will be used as the NOAEL. The LOAEL that was selected was from a 2-year, 3-generation study by Azar et al. (1973). In this study 80 mg Pb/kg BW/day caused reduced offspring weights (LOAEL) in rats.
TRVNOAEL = 34 mg Pb/kg BW/day
TRVLOAEL = 80 mg Pb/kg BW/day
Other studies examined a single dose (Schroeder and Mitchener 1971), shorter exposure duration (Draski et al. 1989), or non-reproductive endpoints (NTP 1996; Grant et al. 1980; Fowler et al. 1980).

3.1.10 Manganese

Based on work by Laskey et al. (1982), Sample et al. (1996) from ORNL calculated a mammalian NOAEL of 88 and a LOAEL of 284 mg Mn/kg BW/day.

3.1.11 Mercury

Inorganic Mercury

Three studies were evaluated. The NOAEL selected for inorganic mercury is based on the results of a study by Revis et al. (1989). Revis et al. (1989) reported a 20-month

NOAEL of 13.2 mg Hg/kg BW/day for lethality that included 6-month estrous-cycle assessment on reproduction in mice exposed to mercuric chloride. This is proposed as the NOAEL. No LOAEL was available from the Revis et al. (1989) study However, another study Fitzhugh et al. (1950) reported a 2-year LOAEL of 56 mg Hg/kg BW/day for growth in rats exposed to mercuric chloride. This is proposed as the LOAEL. The third study reviewed was one by Aulerich et al. (1974), which examined only a single, lower, no effect dose for a shorter time period.
TRVNOAEL = 13.2mg Hg/kg BW/day
TRVLOAEL = 56 mg Hg/kg BW/day

Methylmercury
Five studies were evaluated. The TRV NOAEL was derived from a study by Dansereau et al. (1999). In this study mink were fed fish that were naturally contaminated with organic mercury at concentrations of 0.6, and 0.9 mg MeHg/kg wet weight for two generations (400 days). There were no adverse effects on females whelped, gestation length, kits per litter, kit survival or kit growth at the 0.5 mg Me/kg concentration. Bleavins and Auerlich (1981) reported that mink consume 0.137 kg dry weight food/kg BW/day. The NOAEL and LOAEL from this study are 0.08 and 0.12 mg MeHg/kg BW/day.
TRVNOAEL = 0.08 mg MeHg/kg BW/day
TRVLOAEL = 0.12 mg MeHg/kg BW/day
Other studies lasted for shorter durations and reported higher effects doses (Wobeser et al. 1976a, 1976b), higher no effects doses (Aulerich et al. 1974), or had other factors that affected toxicity (Wren et al. 1987; Holbrook et al. 1999).

Because the TRVs for inorganic mercury are based on a predominantly terrestrial mammal, and the ROCs are being evaluated for exposure to mercury in soil, the TRVs for inorganic mercury were used for this ecological evaluation.

3.1.12 Nickel

For selection of NOAEL and LOAEL TRVs, five studies were evaluated. The NOAEL selected for nickel is based on results from a study by Ambrose et al. (1976). Ambrose et al. (1976) fed rats nickel chloride for three generations and found no adverse effect on lactation, fertility, gestation, or offspring viability at a dose of 60 mg Ni/kg BW/day. This is proposed as the NOAEL. The LOAEL from this study was 80 mg Ni/kg BW/day.
TRVNOAEL = 60 mg Ni/kg BW/day
TRVLOAEL = 80 mg Ni/kg BW/day
Other studies eaxmined lacked clear dose-response relationships (Smith et al. 1993), experienced abnormal holding conditions that caused adverse effects (RTI 1987), were conducted for a shorter duration (Vyskocil et al. 1994), or examined only a single dose (Schroeder and Mitchener 1971).

3.1.13 Selenium

For selection of NOAEL and LOAEL TRVs, three chronic studies with reproductive endpoints were evaluated. The NOAEL selected was based on the study by Rosenfeld and Beath (1954). Other studies used only a single dose and did not produce a NOAEL

(Schroeder and Mitchener 1971), or used a shorter exposure duration and did not measure reproductive success (NTP 1994).

Rosenfeld and Beath (1954) exposed pregnant rats to 0.21, 0.35, or 1.05 mg Se/kg BW/day (as potassium selenate in drinking water) and reported no adverse effects on the number of normal litters at 0.35 mg/kg BW/day in the first generation. Therefore:
TRVNOAEL = 0.35 mg Se/kg BW/day
TRVLOAEL = 1.05 mg Se/kg BW/day

3.1.14 Thallium

For selection of NOAEL and LOAEL TRVs, four studies were evaluated. The NOAEL selected for thallium is based on a study by U.S. EPA (1986) and used by IRIS as the NOAEL for the protection of human health. Other studies were of shorter duration at a single dose level (Formigli et al. 1986), evaluated only mortality (Downs et al. 1960) or evaluated mortality and neural histology (Manzo et al. 1983).

U.S. EPA (1986) exposed rats to thallium sulfate at doses of 0, 0.008, 0.04, or 0.20 mg Tl/kg BW/day for 90-days and reported no adverse effects on body weight, organ weight, hematology or clinical chemistry, or food consumption and did not produce histopathologic lesions at the highest dose tested (the only adverse effect found was alopecia or hair loss). Since rats reproduce within 8-10 weeks of birth, this is viewed as a chronic NOAEL for ecological receptors. The LOAEL was estimated by multiplying the NOAEL by 5 (Lewis et al. (1990).
TRVNOAEL = 0.2 mg Tl/kg BW/day
TRVLOAEL = 1.0 mg Tl/kg BW/day

3.1.15 Vanadium

U.S. EPA (2005) conducted an extensive review of the available toxicity data for vanadium. The geometric mean NOAEL was 5.92 mg/kg BW/day and the geometric mean LOAEL was 8.3 mg/kg BW/day. Therefore:
TRVNOAEL = 5.9 mg V/kg BW/day
TRVLOAEL = 8.3 mg V/kg BW/day

3.1.16 Silver

For selection of NOAEL and LOAEL TRVs, two studies were evaluated. The LOAEL was selected from the study by Matuk et al (1981), which evaluated growth endpoints. The other study by Olcott (1950) reported enlargement of the left ventricle and a slight thickening of the glomerular basement membrane, endpoints that were not considered as relevant as growth.

Matuk et al (1981) exposed rats to 222 mg Ag/kg BW/day for 37-weeks and reported decreased growth and life span. ATSDR (1990) considered this a "less serious" LOAEL. The NOAEL was estimated from this LOAEL by dividing by 5 (Lewis et al. 1990).
TRVNOAEL = 44.4 mg Ag/kg BW/day
TRVLOAEL = 222 mg Ni/kg BW/day

3.1.17 Zinc

For selection of the NOAEL and LOAEL, four studies were evaluated. The NOAEL selected for zinc is based on results reported by Schlicker and Cox (1968), and Aulerich et al. (1991). Schlicker and Cox (1968) fed rats zinc oxide for 16-days during gestation and found no adverse effects on mating, fertilization, implantation, and fetal development at 160 mg Zn/kg BW/day. The LOAEL from this study was 320 mg Zn/kg BW/day. However, in another study with mink, Aulerich et al. (1991) reported that concentrations of 0, 500, 1000, or 1500 mg Zn/kg food caused no adverse effects on body weight, food consumption, hematological parameters, or histological lesions in the pancreas, liver, or kidney after 144-days. For mink the highest concentration in this study (1500 mg Zn/kg food is equivalent to a NOAEL of 205 mg Zn/kg BW/day.
Since the NOAEL from the Schlicker and Cox (1968) is lower, this will be used along with the LOAEL from the same study for a more conservative risk estimate.
TRVNOAEL = 160 mg Zn/kg BW/day
TRVLOAEL = 320 mg Zn/kg BW/day
Other studies reached similar NOAEL conclusions (Ketcheson et al. 1969; Maita et al. 1981, Aughey et al. 1977) but did not provide LOAEL values.

3.2 Non-Metal Inorganics (Cyanide)

Eisler et al. (1999) list acute oral doses of cyanide for six different species of mammals. These single-dose LD50 values range from 3.0 mg CN/kg BW for the humans to 28 mg CN/kg BW for the white-footed mouse. Therefore, some mammals are more sensitive than others. In addition to the data presented by Eisler et al. (1999), it is well known that ruminants are more sensitive to prussic acids in plants than monogastric herbivores, presumably because their enteric bacteria release additional cyanide from the plant tissue. However, as discussed above for birds, large single doses overwhelm the ability of animals to detoxify cyanide and chronic effects cannot be estimated from acute data so that these values cannot be used to estimate risk at the East Chicago Site.

Seven chronic or sensitive life-stage studies were evaluated. The study by Tewe and Maner (1981) was selected for derivation of the mammalian TRVs. Tewe and Maner (1981) reported no adverse effects on reproductive performance or lactation of rats fed 500 mg cyanide/kg diet throughout gestation and lactation. Litter size, weight of pups at birth, and food consumption and growth rate of pups were not significantly different from controls at a dose of 68.7 mg CN/kg BW/day. No LOAEL is available, but, following Lewis et al. (1990), the LOAEL was estimated from the NOAEL by multiplying the NOAEL by a factor of five. Therefore,
NOAEL = 68.7 mg CN/kg BW/day
LOAEL = 343.5 mgCN/kg BW/day

Other studies only tested lower doses (Howard and Hanzal 1955; Leuschner et al. 1991), produced contradictory results (Singh 1981; Frakes et al. 1986a,b) or produced effects with questionable relevance to reproduction (NTP 1993).

3.3 Organic Chemicals

3.3.1 DDT

The U.S. EPA (1995) selected the study by Fitzhugh (1954) as the basis for their TRV for DDT. However, carcinogenesis was the primary objective of this study and reproductive effects were mentioned only in a cursory manner. Furthermore, even with regards to the primary objective, ATSDR (1997) concluded that, because of the few experimental details in this report that it should be reproduced using "modern histopathological techniques and current views on the physiological meaning of specific liver changes." A number of studies designed to evaluate the reproductive effects of DDT has been conducted on multiple species for longer durations and found no adverse effects of DDT on reproduction at much higher doses. Therefore, eleven studies were evaluated.

The NOAEL was based on studies by Treon et al. (1954), Ottoboni (1972), Wolfe et al. (1979), Keplinger et al. (1970), 1972), Aulerich and Ringer (1970), Duby et al. (1971), and Ottoboni (1969). Treon et al. (1954) and Ottoboni (1972) exposed rats to DDT and reported no adverse effect on reproduction at doses of 1.5 and 1.7 mg DDT/kg BW/day, respectively. The former study lasted 3 generations and the latter study lasted 11 generations. Wolfe et al. (1979) exposed field mice to doses up to 2.4 mg DDT/kg BW/day for 15 months and reported no adverse effects on fecundity or fertility. Keplinger et al. (1970) exposed six successive generations of mice (with two reproductive cycles per generation) to 5, 20 or 50 mg DDT/kg BW/day and reported no adverse effects on fertility as indicated by decrease viability of offspring or decreased lactation at 5 mg DDT/kg BW/day. In this study, adverse reproductive effects were reported at 20 mg DDT/kg BW/day. Aulerich and Ringer (1970) exposed mink to 100 mg/kg diet and reported no toxicity or adverse effects on reproduction, kit growth or survival. Similarly, while Duby et al. (1971) found a slight estrogenic effect in rats and mink injected with 4,4'-DDT there was no adverse effect on reproduction in two successive generations of rats and mink diets containing 100 mg 4,4'-DDT. For rats and mink, these are doses of 1.5 and 13.7 mg 4,4'-DDT/kg BW/day. Ottoboni (1969) exposed rats to DDT for 2 generations and reported no adverse effect on reproduction at a dose of 18.6 mg DDT/kg BW/day.

These studies show that rodent reproduction is not adversely affected by DDT at the NOAEL of 0.9 mg DDT/kg BW/day estimated by Fitzhugh (1954). The lowest NOAEL found in subsequent chronic exposures to rats is 1.5 mg DDT/kg BW/day and this is simply the lowest concentration tested and not a true indication of the actual highest concentration that caused no adverse effects. The upper bound of the range of chronic NOAELs listed above is the LOAEL, 20 mg DDT/kg BW/day, reported by Keplinger et al. (1970). However, because the true NOAEL is not known, the geometric mean of the six individual rodent NOAELs was selected as a moderately conservative estimate of the true NOAEL. The minimum variance-unbiased estimator of the log transformed mean of the rodent NOAELs is 4.54 mg DDT/kg BW/day. This TRV is most applicable to terrestrial mammals that consume terrestrial prey. Applying the NOAEL-LOAEL conversion factor resulted in a calculated LOAEL of 22.7 mg/kg BW/day.
NOAEL = 4.54 mg/kg BW/day

LOAEL = 22.7 mg/kg BW/day

3.3.2 Methoxychlor

Based on a study by Gray et al. (1988), Sample et al. (1996) calculated a NOAEL of 4.0 and a LOAEL of 8.0 mg/kg BW/day.

3.3.3 Aroclors 1254 and 1260

Based on a study by McCoy et al (1995) using oldfield mice, Sample et al. (1996) calculated a NOAEL of 0.068 and a LOAEL of 0.68 mg/kg BW/day for aroclor 1254. A NOAEL of 0.01 and a LOAEL of 0.1 mg/kg BW/day was used for both aroclor 1254 and aroclor 1260.

3.4 Summary of Mammalian TRVs

The following table summarizes mammalian NOAEL and LOAEL TRVs.

Parameter	NOAEL-TRV (mg/kg BW/day)	LOAEL-TRV (mg/kg BW/day)
Antimony	13.3	66.5
Arsenic	5.7	11.6
Barium	51.8	259
Boron	28	94
Cadmium	5.1	7.1
Chromium	7.4	37
Cobalt	7.34	36.7
Copper	11.7	15.1
Lead	34	80
Manganese	88	284
Mercury	13.2	56
Nickel	60	80
Selenium	0.35	1.05
Thallium	0.2	1.0
Vanadium	5.9	8.3
Silver	44.4	222
Zinc	160	320
Cyanide	68.7	343.5
DDT	4.54	22.7
Methoxychlor	4.0	8.0
Aroclor 1254	0.01	0.1
Aroclor 1260	0.01	0.1

Notes:

1 While DDT may be metabolized to the proximal toxicant (DDE), DDD is without effect on eggshell thickness (Heath et al. 1969). In addition, o,p'-DDT and its metabolites are without effect on eggshell thinning because they do not bioccumulate to appreciable levels (Bitman et al. 1969; Lundholm 1980). Therefore, these compounds

were not included in the dose calculations. However, because p,p'-DDT may be metabolized to p,p'-DDE, only the TRV for DDE was used to evaluate risk.
2 The dry weight equation for the ingestion rate of Pelicaniformes is 0.279*(g BW).845.
3 Despite early reports of mass die-offs of American robins due to large amounts of DDT applied to control Dutch elm disease (Wurster et al. 1965; Hunt, 1969), Blus (1996) also concluded that song birds, in general, and the American robin, in particular, are insensitive to SDDX, and Beaver (1980) concluded that the effects of DDT on robin reproduction were due to parents. Johnson et al. (1976) reported no adverse effects on adult mortality or reproduction in robins living in fruit orchards after spraying with DDT ceased.

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TABLE F-1
SUMMARY OF EXPOSURE PARAMETERS FOR RECEPTORS OF CONCERN
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Representative Species			Home Range[1]	Home Range Reference	Area Use Factor (AUF)		Body Weight (kg wet weight)	Dietary Composition					Ingestion Rates				
													Food		Substrate		
Common Name	Scientific Name	Food-web classification			Preliminary Exposure Estimate	Refined Exposure Estimate		Plant Material	Invertebrates	Fish	Small Mammals	References	kg dry weight/day	Reference	% of Dry Intake	kg dry wt./day	Reference
Avian Receptors																	
American robin	*Turdus migratorius*	small soil probing invertivore	0.4 ha	Sample and Suter (1994)	1.0	1.0	0.077	60%	40%			Sample and Suter (1994)[3]	0.012	Nagy (2001)[5]	4.2%	0.0005	Beyer et al (1994)
Canada goose	*Branta canadensis*	terrestrial herbivore	983 ha	USEPA (1993)	1.0	1.0	3.55	100%				USEPA (1993)	0.113	Nagy (2001)[6]	8%	0.009	Beyer et al. (1994)
Red-tailed hawk	*Buteo jamaicensis*	terrestrial carnivore	233	Sample and Suter (1994)	1.0	1.0	1.126				100%	Sample and Suter (1994)	0.090	Nagy (2001)[4]	0%	0	Sample and Suter (1994)
Song sparrow	*Melospiza melodia*	small omnivore	0.2 to 0.6 ha	DeGraaf et al (1986)	1.0	1.0	0.02	25%	75%			Cornell (2003)	0.004	Nagy (2001)[6]	8.8%	0.00039	Estimated[13]
Mammalian Receptors																	
Deer mouse	*Peromyscus maniculatusi*	small terrestrial herbivore	0.54 to 0.94 ha	USEPA (1993)	1.0	1.0	0.017	50%	50%			USEPA (1993)	0.004	Nagy (2001)	2.4%	0.0001	Estimated 13c
Groundhog	*Marmota monax*	terrestrial herbivore	3 ha	Merritt (1987)	1.0	1.0	2.000	100%				Merritt (1987)	0.1016	Nagy (2001)[10]	2%	0.00203	Beyer et al. (1994)
Red fox	Vulpes vulpes	medium terrestrial omnivore	97 - 687 ha	Sample and Suter (1994)	1.0	1.0	4.5	10%			90%	Sample and Suter (1994)	0.146	Nagy (2001)[7]	2.8%	0.004	Beyer et al (1994)
Short-tailed shrew	*Blarina brevicauda*	small terrestrial invertivore	0.39 ha	Sample and Suter (1994)	1.0	1.0	0.015		100%			Sample and Suter (1994)	0.002	Nagy (2001)[9]	13%	0.00026	Sample and Suter (1994)
White-tailed deer	*Odocoileus virginianus*	large terrestrial herbivore	16.1 - 121 ha	DeGraaf et al. (1986)	1.0	1.0	56.5	100%				Sample and Suter (1994)	0.828	Nagy (2001)[10]	2.0%	0.0166	Beyer et al (1994)

Notes:
1. ND, no data available for this parameter; km, kilometers, ha, hectares.
2. Water ingestion rates estimate from allometric regression formulas presented in Calder and Braun (1983) as cited in Sample and Suter (1994);
3. Dietary composition based on average annual percentage of each component for females.
4. Estimated food ingestion rate (kg/day dry weight) for carnivorous birds = (0.849[Body Weight in kg]$^{0.663}$) (Nagy 2001);
5. Estimated food ingestion rate (kg/day dry weight) for insectivorous birds = (0.540[Body Weight in kg]$^{0.705}$) (Nagy 2001);
6. Estimated food ingestion rate (kg/day dry weight) for omnivorous birds = (0.670[Body Weight in kg]$^{0.627}$) (Nagy 2001);
7. Estimated food ingestion rate (kg/day dry weight) for Carnivora = (0.102[Body Weight in kg]$^{0.864}$) (Nagy 2001);
8. Estimated food ingestion rate (kg/day dry weight) for Chiroptera = (0.365[Body Weight in kg]$^{0.671}$) (Nagy 2001);
9. Estimated food ingestion rate (kg/day dry weight) for mammalian insectivores = (0.373[Body Weight in kg]$^{0.672}$) (Nagy 2001);
10. Estimated food ingestion rate (kg/day dry weight) for herbivores = (0.859[Body Weight in kg]$^{0.628}$) (Nagy 2001).
11. Assumption based on assumption from Sample and Suter 1994 that substrate ingestion is neglible for barn owl and red-tailed hawk;
12. Assumption based on assumption from Sample and Suter 1994 that substrate ingestion is neglible for piscivores.
13. Estimated based on median soil ingestion rate for similar ground gleaning bird (dove) reported by USEPA (2003).
14. Assumption based on assumption from Sample and Suter 1994 that substrate ingestion is neglible for aerial insectivores;
15. Estimated based on soil ingestion rate for reported for red fox (Beyer et al 1994).

TABLE F-2
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	log K_{ow}	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
			Plants			Soil Invertebrates			Small Mammals		
			Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Metals											
Antimony	NA	884	Regression[a]	2.3E+01	USEPA (2003a)[a]	1.0E+00	8.8E+02	Assumption[c]	2.0E-04	1.8E-01	Baes et al. (1984)[f]
Arsenic	NA	62000	Regression[a]	6.6E+01	Efroymson et al. (2001)[a]	Regression[d]	5.5E+02	Sample et al. (1999a)[d]	Regression[g]	6.6E+01	Sample et al. (1998b)[g]
Barium	NA	7720	1.50E-01	1.2E+03	Baes et al. (1984)	9.1E-02	7.0E+02	Sample et al. (1998)[b]	5.7E-02	4.4E+02	Sample et al. (1998b)[h]
Boron	NA	118	1.00E+00	1.2E+02	Assumption	1.0E+00	1.2E+02	Assumption	1.0E+00	1.2E+02	Assumption
Cadmium	NA	1020	Regression[a]	2.8E+01	Efroymson et al. (2001)[a]	Regression[d]	1.6E+03	Neuhauser et al. (1995)	Regression[g]	1.1E+01	Sample et al. (1998b)[g]
Chromium	NA	234	7.50E-03	1.8E+00	Baes et al. (1984)	3.1E-01	7.2E+01	Sample et al. (1998a)[e]	Regression[g]	1.3E+01	Sample et al. (1998b)[g]
Copper	NA	4470	Regression[a]	5.2E+01	Efroymson et al. (2001)[a]	Regression[d]	4.91E+01	Sample et al. (1999a)[d]	Regression[g]	3.7E+01	Sample et al. (1998b)[g]
Lead	NA	58300	Regression[a]	1.2E+02	Efroymson et al. (2001)[a]	Regression[d]	5.9E+03	Sample et al. (1999a)[d]	Regression[g]	1.6E+02	Sample et al. (1998b)[g]
Nickel	NA	569	Regression[a]	1.3E+01	Efroymson et al. (2001)[a]	1.1E+00	6.0E+02	Sample et al. (1998a)[e]	Regression[g]	1.5E+01	Sample et al. (1998b)[g]
Selenium	NA	902	Regression[a]	9.0E+02	Efroymson et al. (2001)[a]	Regression[d]	1.3E+02	Sample et al. (1999a)[d]	Regression[g]	8.5E+00	Sample et al. (1998b)[g]
Vanadium	NA	412	5.50E-03	2.3E+00	Baes et al. (1984)	4.2E-02	1.7E+01	Sample et al. (1998a)[b]	1.4E-05	5.7E-03	Baes et al. (1984)[f]
Zinc	NA	120000	Regression[a]	3.4E+03	Efroymson et al. (2001)[a]	Regression[d]	4.0E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]
Organics											
Aroclor 1254	6.34	0.095	0.2	1.5E-02	USEPA (2005)[n]	Regression[d]	1.7E-01	Sample et al. (1999a)[d]	Regression[g]	1.7E-01	Sample et al. (1998b)[g]
Aroclor 1260	6.34	0.165	0.2	2.7E-02	USEPA (2005)[n]	Regression[d]	3.5E-01	Sample et al. (1999a)[d]	Regression[g]	3.1E-01	Sample et al. (1998b)[g]
DDT	6.53	0.00957	1.35E-01	1.30E-03	USEPA (2005)[n]	Regression[d]	1.5E-01	USEPA (2005)[d]	Regression[q]	8.1E-01	USEPA (2005)[q]
Methoxychlor	5.08	1.87	5.25E-01	9.81E-01	USEPA (2005)[n]	3.86E+00	7.21E+00	USEPA (2005)[o]	3.6E-02	2.6E-01	Travis and Arms (1988)[p]
Other											
Cyanide	NA	0.97	1.00E+00	9.7E-01	Assumption[l]	1.0E+00	9.7E-01	Assumption[l]	1.0E+00	9.7E-01	Assumption[l]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)
PCBs	1.41	1.36	Sample et al. (1999) based on data for TCDD
DDT	2.1247	0.8689	USEPA (2005)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

n. Soil-to-plant BAF based on K_{ow} model for non-ionic organic compounds (rinsed foliage data) provided in USEPA (2005), where: log BAF = -0.4057(log K_{ow}) + 1.781

o. Estimation of soil-to-earthworm bioaccumulation factors for non-ionic organic compounds based on USEPA (2005)

p. Bioconcentration factor (BCF) from diet to tissue based on log K_{ow}, where log[tissue] = -7.6 + log K_{ow} * 12 (average correction factor of lactating and non-lactating animals); BCF multiplied by soil invertebrate tissue concentration for a conservative estimation of ti

q. Bioconcentration factor (BCF) from diet to tissue based on regression models from USEPA (2005): ln([tissue]) = B0 + B1(ln[diet]), where diet is the estimated concentrations in soil invertebrates and slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
DDT	1.1788	0.7254	USEPA (2005)

l. NA. Data not available

TABLE F-3
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	log K_{ow}	Mean Soil Exposure Point Concentration[1] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
			Plants			Soil Invertebrates			Small Mammals		
			Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Metals											
Antimony	NA	105	Regression[a]	3.1E+00	USEPA (2003a)[a]	1.0E+00	1.1E+02	Assumption[c]	2.0E-04	2.1E-02	Baes et al. (1984)[f]
Arsenic	NA	2052	Regression[a]	9.8E+00	Efroymson et al. (2001)[a]	Regression[d]	5.0E+01	Sample et al. (1999a)[d]	Regression[g]	4.0E+00	Sample et al. (1998b)[g]
Barium	NA	975	1.50E-01	1.5E+02	Baes et al. (1984)	9.1E-02	8.9E+01	Sample et al. (1998)[b]	5.7E-02	5.5E+01	Sample et al. (1998b)[h]
Boron	NA	25.8	1.00E+00	2.6E+01	Assumption	1.0E+00	2.6E+01	Assumption	1.0E+00	2.6E+01	Assumption
Cadmium	NA	125	Regression[a]	8.8E+00	Efroymson et al. (2001)[a]	Regression[d]	3.9E+02	Neuhauser et al. (1995)	Regression[g]	3.3E+00	Sample et al. (1998b)[g]
Chromium	NA	29.1	7.50E-03	2.2E-01	Baes et al. (1984)	3.1E-01	8.9E+00	Sample et al. (1998a)[a]	Regression[g]	2.8E+00	Sample et al. (1998b)[g]
Copper	NA	518	Regression[a]	2.2E+01	Efroymson et al. (2001)[a]	Regression[d]	2.78E+01	Sample et al. (1999a)[d]	Regression[g]	2.5E+01	Sample et al. (1998b)[g]
Lead	NA	9443	Regression[a]	4.5E+01	Efroymson et al. (2001)[a]	Regression[d]	1.3E+03	Sample et al. (1999a)[d]	Regression[g]	6.2E+01	Sample et al. (1998b)[g]
Nickel	NA	61.1	Regression[a]	2.4E+00	Efroymson et al. (2001)[a]	1.1E+00	6.5E+01	Sample et al. (1998a)[a]	Regression[g]	5.3E+00	Sample et al. (1998b)[g]
Selenium	NA	142	Regression[a]	1.2E+02	Efroymson et al. (2001)[a]	Regression[d]	3.5E+01	Sample et al. (1999a)[d]	Regression[g]	4.3E+00	Sample et al. (1998b)[g]
Vanadium	NA	55.2	5.50E-03	3.0E-01	Baes et al. (1984)	4.2E-02	2.3E+00	Sample et al. (1998a)[b]	1.4E-05	7.6E-04	Baes et al. (1984)[f]
Zinc	NA	22555	Regression[a]	1.3E+03	Efroymson et al. (2001)[a]	Regression[d]	2.3E+03	Sample et al. (1999a)[d]	Regression[g]	1.8E+02	Sample et al. (1998b)[g]
Organics											
Aroclor 1254	6.34	0.040	0.2	6.5E-03	USEPA (2005)[n]	Regression[d]	5.2E-02	Sample et al. (1999a)[d]	Regression[g]	6.6E-02	Sample et al. (1998b)[g]
Aroclor 1260	6.34	0.064	0.2	1.0E-02	USEPA (2005)[n]	Regression[d]	9.7E-02	Sample et al. (1999a)[d]	Regression[g]	1.1E-01	Sample et al. (1998b)[g]
DDT	6.53	0.010	1.35E-01	1.31E-03	USEPA (2005)[n]	Regression[d]	1.5E-01	USEPA (2005)[d]	Regression[g]	8.1E-01	USEPA (2005)[g]
Methoxychlor	5.08	0.554	5.25E-01	2.91E-01	USEPA (2005)[n]	3.86E+00	2.14E+00	USEPA (2005)[o]	3.6E-02	7.7E-02	Travis and Arms (1988)[p]
Other											
Cyanide	NA	0.468	1.00E+00	4.7E-01	Assumption[f]	1.0E+00	4.7E-01	Assumption[f]	1.0E+00	4.7E-01	Assumption[f]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]) Slopes (B1) and intercepts (B0) are as follows.

Analyte	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)
PCBs	1.41	1.36	Sample et al. (1999) based on data for TCDD
DDT	2.1247	0.8689	USEPA (2005)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

n. Soil-to-plant BAF based on K_{ow} model for non-ionic organic compounds (rinsed foliage data) provided in USEPA (2005), where: log BAF = -0.4057(log K_{ow}) + 1.781

o. Estimation of soil-to-earthworm bioaccumulation factors for non-ionic organic compounds based on USEPA (2005)

p. Bioconcentration factor (BCF) from diet to tissue based on log K_{ow} where log[tissue] = -7.6 + log K_{ow} * 12 (average correction factor of lactating and non-lactating animals); BCF multiplied by soil invertebrate tissue concentration for a conservative estimation c

q. Bioconcentration factor (BCF) from diet to tissue based on regression models from USEPA (2005). ln([tissue]) = B0 + B1(ln[diet]), where diet is the estimated concentrations in soil invertebrates and slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
DDT	1.1788	0.7254	USEPA (2005)

NA. Data not available

TABLE F-4
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
REDEVELOPMENT AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	log K_{ow}	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
			Plants			Soil Invertebrates			Small Mammals		
			Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Metals											
Antimony	NA	7360	Regression[a]	1.7E+02	USEPA (2003a)[e]	1.0E+00	7.4E+03	Assumption[c]	2.0E-04	1.5E+00	Baes et al. (1984)[f]
Arsenic	NA	99400	Regression[a]	8.6E+01	Efroymson et al. (2001)[e]	Regression[d]	7.6E+02	Sample et al. (1999a)[d]	Regression[g]	9.7E+01	Sample et al. (1998b)[g]
Barium	NA	13900	1.50E-01	2.1E+03	Baes et al. (1984)	9.1E-02	1.3E+03	Sample et al. (1998)[b]	5.7E-02	7.9E+02	Sample et al. (1998b)[h]
Boron	NA	69.3	1.00E+00	6.9E+01	Assumption	1.0E+00	6.9E+01	Assumption	1.0E+00	6.9E+01	Assumption
Cadmium	NA	5930	Regression[a]	7.4E+01	Efroymson et al. (2001)[e]	Regression[d]	5.0E+03	Neuhauser et al. (1995)	Regression[g]	2.9E+01	Sample et al. (1998b)[g]
Chromium	NA	895	7.50E-03	6.7E+00	Baes et al. (1984)	3.1E-01	2.7E+02	Sample et al. (1998a)[e]	Regression[g]	3.4E+01	Sample et al. (1998b)[g]
Cobalt		22.6	2.00E-02	4.5E-01	Baes et al. (1984)	1.2E-01	2.8E+00	Sample et al. (1998)[b]	2.1E-02	4.6E-01	Sample et al. (1998b)[h]
Copper	NA	5100	Regression[a]	5.5E+01	Efroymson et al. (2001)[e]	Regression[d]	5.08E+01	Sample et al. (1999a)[d]	Regression[g]	3.8E+01	Sample et al. (1998b)[g]
Lead	NA	147000	Regression[a]	2.1E+02	Efroymson et al. (2001)[e]	Regression[d]	1.2E+04	Sample et al. (1999a)[d]	Regression[g]	2.6E+02	Sample et al. (1998b)[g]
Manganese		485	2.50E-01	1.2E+02	Baes et al. (1984)	Regression[d]	3.0E+01	Sample et al. (1999a)[d]	1.0E-04	4.9E-02	Baes et al. (1984)[f]
Mercury		52.1	Regression[a]	3.1E+00	Efroymson et al. (2001)[e]	Regression[d]	4.0E+00	Sample et al. (1999a)[d]	5.4E-02	2.8E+00	Sample et al. (1998b)[h]
Nickel	NA	122	Regression[a]	4.0E+00	Efroymson et al. (2001)[e]	1.1E+00	1.3E+02	Sample et al. (1998a)[e]	Regression[g]	7.3E+00	Sample et al. (1998b)[g]
Selenium	NA	239	Regression[a]	2.1E+02	Efroymson et al. (2001)[e]	Regression[d]	5.1E+01	Sample et al. (1999a)[d]	Regression[g]	5.2E+00	Sample et al. (1998b)[g]
Silver		100	4.00E-01	4.0E+01	Baes et al. (1984)	2.0E+00	2.0E+02	Sample et al. (1998)[b]	1.2E-03	1.2E-01	Baes et al. (1984)[f]
Thallium		7.21	4.00E-03	2.9E-02	Baes et al. (1984)	1.0E+00	7.2E+00	Assumption[c]	1.1E-01	8.1E-01	Sample et al. (1998b)[h]
Vanadium	NA	152	5.50E-03	8.4E-01	Baes et al. (1984)	4.2E-02	6.4E+00	Sample et al. (1998a)[b]	1.4E-05	2.1E-03	Baes et al. (1984)[f]
Zinc	NA	130000	Regression[a]	3.5E+03	Efroymson et al. (2001)[e]	Regression[d]	4.1E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]
Organics											
DDT	6.53	2.43	1.35E-01	3.29E-01	USEPA (2005)[n]	Regression[d]	1.8E+01	USEPA (2005)[d]	Regression[q]	2.7E+01	USEPA (2005)[q]
Methoxychlor	5.08	0.512	5.25E-01	2.69E-01	USEPA (2005)[n]	3.86E+00	1.97E+00	USEPA (2005)[o]	3.6E-02	7.2E-02	Travis and Arms (1988)[p]
Other											
Cyanide	NA	58	1.00E+00	5.8E+01	Assumption[l]	1.0E+00	5.8E+01	Assumption[l]	1.0E+00	5.8E+01	Assumption[l]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows

Analyte	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)
PCBs	1.41	1.36	Sample et al. (1999) based on data for TCDD
DDT	2.1247	0.8689	USEPA (2005)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor

n. Soil-to-plant BAF based on K_{ow} model for non-ionic organic compounds (rinsed foliage data) provided in USEPA (2005), where: log BAF = -0.4057(log K_{ow}) + 1.781

o. Estimation of soil-to-earthworm bioaccumulation factors for non-ionic organic compounds based on USEPA (2005)

p. Bioconcentration factor (BCF) from diet to tissue based on log K_{ow} where log[tissue] = -7.6 + log K_{ow} * 12 (average correction factor of lactating and non-lactating animals); BCF multiplied by soil invertebrate tissue concentration for a conservative estimation of

q. Bioconcentration factor (BCF) from diet to tissue based on regression models from USEPA (2005): ln([tissue]) = B0 + B1(ln[diet]), where diet is the estimated concentrations in soil invertebrates and slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
DDT	1.1788	0.7254	USEPA (2005)

NA. Data not available

TABLE F-5
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
REDEVELOPMENT AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	log K_{ow}	Mean Soil Exposure Point Concentration[1] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
			Plants			Soil Invertebrates			Small Mammals		
			Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Metals											
Antimony	NA	186	Regression[a]	5.3E+00	USEPA (2003a)[a]	1.0E+00	1.9E+02	Assumption[c]	2.0E-04	3.7E-02	Baes et al. (1984)[f]
Arsenic	NA	1773	Regression[a]	9.0E+00	Efroymson et al. (2001)[a]	Regression[d]	4.5E+01	Sample et al. (1999a)[d]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Barium	NA	1693	1.50E-01	2.5E+02	Baes et al. (1984)	9.1E-02	1.5E+02	Sample et al. (1998)[b]	5.7E-02	9.6E+01	Sample et al. (1998b)[h]
Boron	NA	31.8	1.00E+00	3.2E+01	Assumption	1.0E+00	3.2E+01	Assumption	1.0E+00	3.2E+01	Assumption
Cadmium	NA	163	Regression[a]	1.0E+01	Efroymson et al. (2001)[a]	Regression[d]	4.7E+02	Neuhauser et al. (1995)	Regression[g]	3.8E+00	Sample et al. (1998b)[g]
Chromium	NA	58.6	7.50E-03	4.4E-01	Baes et al. (1984)	3.1E-01	1.8E+01	Sample et al. (1998a)[a]	Regression[g]	4.6E+00	Sample et al. (1998b)[g]
Cobalt		6.81	2.00E-02	1.4E-01	Baes et al. (1984)	1.2E-01	8.3E-01	Sample et al. (1998)[b]	2.1E-02	1.4E-01	Sample et al. (1998b)[h]
Copper	NA	578	Regression[a]	2.3E+01	Efroymson et al. (2001)[a]	Regression[d]	2.86E+01	Sample et al. (1999a)[d]	Regression[g]	2.5E+01	Sample et al. (1998b)[g]
Lead	NA	18943	Regression[a]	6.6E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+03	Sample et al. (1999a)[d]	Regression[g]	8.9E+01	Sample et al. (1998b)[g]
Manganese		244	2.50E-01	6.1E+01	Baes et al. (1984)	Regression[d]	1.9E+01	Sample et al. (1999a)[d]	1.0E-04	2.4E-02	Baes et al. (1984)[f]
Mercury		9.56	Regression[a]	1.2E+00	Efroymson et al. (2001)[a]	Regression[d]	2.3E+00	Sample et al. (1999a)[d]	5.4E-02	5.2E-01	Sample et al. (1998b)[h]
Nickel	NA	24.5	Regression[a]	1.2E+00	Efroymson et al. (2001)[a]	1.1E+00	2.6E+01	Sample et al. (1998a)[e]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Selenium	NA	10.7	Regression[a]	6.9E+00	Efroymson et al. (2001)[a]	Regression[d]	5.2E+00	Sample et al. (1999a)[d]	Regression[g]	1.6E+00	Sample et al. (1998b)[g]
Silver		13.8	4.00E-01	5.5E+00	Baes et al. (1984)	2.0E+00	2.8E+01	Sample et al. (1998)[b]	1.2E-03	1.7E-02	Baes et al. (1984)[f]
Thallium		1.52	4.00E-03	6.1E-03	Baes et al. (1984)	1.0E+00	1.5E+00	Assumption[c]	1.1E-01	1.7E-01	Sample et al. (1998b)[h]
Vanadium	NA	27.3	5.50E-03	1.5E-01	Baes et al. (1984)	4.2E-02	1.1E+00	Sample et al. (1998a)[b]	1.4E-05	3.7E-04	Baes et al. (1984)[f]
Zinc	NA	18113	Regression[a]	1.2E+03	Efroymson et al. (2001)[a]	Regression[d]	2.2E+03	Sample et al. (1999a)[d]	Regression[g]	1.8E+02	Sample et al. (1998b)[g]
Organics											
DDT	6.53	0.33	1.35E-01	4.52E-02	USEPA (2005)[n]	Regression[d]	3.2E+00	USEPA (2005)[d]	Regression[g]	7.6E+00	USEPA (2005)[k]
Methoxychlor	5.08	0.093	5.25E-01	4.88E-02	USEPA (2005)[n]	3.86E+00	3.58E-01	USEPA (2005)[o]	3.6E-02	1.3E-02	Travis and Arms (1988)[p]
Other											
Cyanide	NA	18	1.00E+00	1.8E+01	Assumption[l]	1.0E+00	1.8E+01	Assumption[l]	1.0E+00	1.8E+01	Assumption[l]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil])
Slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)
PCBs	1.41	1.36	Sample et al. (1999) based on data for TCDD
DDT	2.1247	0.8689	USEPA (2005)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

n. Soil-to-plant BAF based on K_{ow} model for non-ionic organic compounds (rinsed foliage data) provided in USEPA (2005), where: log BAF = -0.4057(log K_{ow}) + 1.781

o. Estimation of soil-to-earthworm bioaccumulation factors for non-ionic organic compounds based on USEPA (2005)

p. Bioconcentration factor (BCF) from diet to tissue based on log K_{ow}, where log[tissue] = -7.6 + log K_{ow} * 12 (average correction factor of lactating and non-lactating animals); BCF multiplied by soil invertebrate tissue concentration for a conservative estimation of

q. Bioconcentration factor (BCF) from diet to tissue based on regression models from USEPA (2005): ln([tissue]) = B0 + B1(ln[diet]), where diet is the estimated concentrations in soil invertebrates and slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
DDT	1.1788	0.7254	USEPA (2005)

NA. Data not available

TABLE F-6
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
REDEVELOPMENT AREA (0-3 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	log K_{ow}	Maximum Soil Exposure Point Concentration[1] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
			Plants			Soil Invertebrates			Small Mammals		
			Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Metals											
Antimony	NA	7360	Regression[a]	1.7E+02	USEPA (2003a)[e]	1.0E+00	7.4E+03	Assumption[c]	2.0E-04	1.5E+00	Baes et al. (1984)[f]
Arsenic	NA	99400	Regression[a]	8.6E+01	Efroymson et al. (2001)[e]	Regression[d]	7.6E+02	Sample et al. (1999a)[d]	Regression[g]	9.7E+01	Sample et al. (1998b)[g]
Barium	NA	13900	1.50E-01	2.1E+03	Baes et al. (1984)	9.1E-02	1.3E+03	Sample et al. (1998)[b]	5.7E-02	7.9E+02	Sample et al. (1998b)[h]
Boron	NA	69.3	1.00E+00	6.9E+01	Assumption	1.0E+00	6.9E+01	Assumption	1.0E+00	6.9E+01	Assumption
Cadmium	NA	5930	Regression[a]	7.4E+01	Efroymson et al. (2001)[e]	Regression[d]	5.0E+03	Neuhauser et al. (1995)	Regression[g]	2.9E+01	Sample et al. (1998b)[g]
Chromium	NA	895	7.50E-03	6.7E+00	Baes et al. (1984)	3.1E-01	2.7E+02	Sample et al. (1998a)[e]	Regression[g]	3.4E+01	Sample et al. (1998b)[g]
Cobalt		22.6	2.00E-02	4.5E-01	Baes et al. (1984)	1.2E-01	2.8E+00	Sample et al. (1998)[b]	2.1E-02	4.6E-01	Sample et al. (1998b)[h]
Copper	NA	5100	Regression[a]	5.5E+01	Efroymson et al. (2001)[e]	Regression[d]	5.08E+01	Sample et al. (1999a)[d]	Regression[g]	3.8E+01	Sample et al. (1998b)[g]
Lead	NA	147000	Regression[a]	2.1E+02	Efroymson et al. (2001)[e]	Regression[d]	1.2E+04	Sample et al. (1999a)[d]	Regression[g]	2.6E+02	Sample et al. (1998b)[g]
Manganese		465	2.50E-01	1.2E+02	Baes et al. (1984)	Regression[d]	3.0E+01	Sample et al. (1999a)[d]	1.0E-04	4.9E-02	Baes et al. (1984)[f]
Mercury		52.1	Regression[a]	3.1E+00	Efroymson et al. (2001)[e]	Regression[d]	4.0E+00	Sample et al. (1999a)[d]	5.4E-02	2.8E+00	Sample et al. (1998b)[h]
Nickel	NA	122	Regression[a]	4.0E+00	Efroymson et al. (2001)[e]	1.1E+00	1.3E+02	Sample et al. (1998a)[e]	Regression[g]	7.3E+00	Sample et al. (1998b)[g]
Selenium	NA	239	Regression[a]	2.1E+02	Efroymson et al. (2001)[e]	Regression[d]	5.1E+01	Sample et al. (1999a)[d]	Regression[g]	5.2E+00	Sample et al. (1998b)[g]
Silver		100	4.00E-01	4.0E+01	Baes et al. (1984)	2.0E+00	2.0E+02	Sample et al. (1998)[b]	1.2E-03	1.2E-01	Baes et al. (1984)[f]
Thallium		7.21	4.00E-03	2.9E-02	Baes et al. (1984)	1.0E+00	7.2E+00	Assumption[c]	1.1E-01	8.1E-01	Sample et al. (1998b)[h]
Vanadium	NA	152	5.50E-03	8.4E-01	Baes et al. (1984)	4.2E-02	6.4E+00	Sample et al. (1998a)[e]	1.4E-05	2.1E-03	Baes et al. (1984)[f]
Zinc	NA	130000	Regression[a]	3.5E+03	Efroymson et al. (2001)[e]	Regression[d]	4.1E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]
Organics											
DDT	6.53	2.43	1.35E-01	3.29E-01	USEPA (2005)[n]	Regression[j]	1.8E+01	USEPA (2005)[j]	Regression[q]	2.7E+01	USEPA (2005)[q]
Methoxychlor	5.08	0.512	5.25E-01	2.69E-01	USEPA (2005)[n]	3.86E+00	1.97E+00	USEPA (2005)[o]	3.6E-02	7.2E-02	Travis and Arms (1988)[p]
Other											
Cyanide	NA	58	1.00E+00	5.8E+01	Assumption[f]	1.0E+00	5.8E+01	Assumption[f]	1.0E+00	5.8E+01	Assumption[f]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

c, Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil])
Slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)
PCBs	1.41	1.36	Sample et al. (1999) based on data for TCDD
DDT	2.1247	0.8689	USEPA (2005)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor

n. Soil-to-plant BAF based on K_{ow} model for non-ionic organic compounds (rinsed foliage data) provided in USEPA (2005), where. log BAF = -0.4057(log K_{ow}) + 1.781

o. Estimation of soil-to-earthworm bioaccumulation factors for non-ionic organic compounds based on USEPA (2005)

p. Bioconcentration factor (BCF) from diet to tissue based on log K_{ow} where log[tissue] = -7.6 + log K_{ow} * 12 (average correction factor of lactating and non-lactating animals). BCF multiplied by soil invertebrate tissue concentration for a conservative est

q. Bioconcentration factor (BCF) from diet to tissue based on regression models from USEPA (2005) ln([tissue]) = B0 + B1(ln[diet]), where diet is the estimated concentrations in soil invertebrates and slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
DDT	1.1788	0.7254	USEPA (2005)

NA. Data not available

TABLE F-7
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
REDEVELOPMENT AREA (0-3 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	log K_{ow}	Mean Soil Exposure Point Concentration[1] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
			Plants			Soil Invertebrates			Small Mammals		
			Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Metals											
Antimony	NA	186	Regression[a]	5.3E+00	USEPA (2003a)[a]	1.0E+00	1.9E+02	Assumption[c]	2.0E-04	3.7E-02	Baes et al. (1984)[f]
Arsenic	NA	1773	Regression[a]	9.0E+00	Efroymson et al. (2001)[a]	Regression[d]	4.5E+01	Sample et al. (1999a)[d]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Barium	NA	1693	1.50E-01	2.5E+02	Baes et al. (1984)	9.1E-02	1.5E+02	Sample et al. (1998)[b]	5.7E-02	9.6E+01	Sample et al. (1998b)[h]
Boron	NA	32	1.00E+00	3.2E+01	Assumption	1.0E+00	3.2E+01	Assumption	1.0E+00	3.2E+01	Assumption
Cadmium	NA	163	Regression[a]	1.0E+01	Efroymson et al. (2001)[a]	Regression[d]	4.7E+02	Neuhauser et al. (1995)	Regression[g]	3.8E+00	Sample et al. (1998b)[g]
Chromium	NA	59	7.50E-03	4.4E-01	Baes et al. (1984)	3.1E-01	1.8E+01	Sample et al. (1998a)[a]	Regression[g]	4.6E+00	Sample et al. (1998b)[g]
Cobalt		7	2.00E-02	1.4E-01	Baes et al. (1984)	1.2E-01	8.3E-01	Sample et al. (1998)[b]	2.1E-02	1.4E-01	Sample et al. (1998b)[h]
Copper	NA	578	Regression[a]	2.3E+01	Efroymson et al. (2001)[a]	Regression[d]	2.86E+01	Sample et al. (1999a)[d]	Regression[g]	2.5E+01	Sample et al. (1998b)[g]
Lead	NA	18943	Regression[a]	6.6E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+03	Sample et al. (1999a)[d]	Regression[g]	8.9E+01	Sample et al. (1998b)[g]
Manganese		244	2.50E-01	6.1E+01	Baes et al. (1984)	Regression[d]	1.9E+01	Sample et al. (1999a)[d]	1.0E-04	2.4E-02	Baes et al. (1984)[f]
Mercury		10	Regression[a]	1.2E+00	Efroymson et al. (2001)[a]	Regression[d]	2.3E+00	Sample et al. (1999a)[d]	5.4E-02	5.2E-01	Sample et al. (1998b)[h]
Nickel	NA	25	Regression[a]	1.2E+00	Efroymson et al. (2001)[a]	1.1E+00	2.6E+01	Sample et al. (1998a)[a]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Selenium	NA	11	Regression[a]	6.9E+00	Efroymson et al. (2001)[a]	Regression[d]	5.2E+00	Sample et al. (1999a)[d]	Regression[g]	1.6E+00	Sample et al. (1998b)[g]
Silver		14	4.00E-01	5.5E+00	Baes et al. (1984)	2.0E+00	2.8E+01	Sample et al. (1998)[b]	1.2E-03	1.7E-02	Baes et al. (1984)[f]
Thallium		2	4.00E-03	6.1E-03	Baes et al. (1984)	1.0E+00	1.5E+00	Assumption[c]	1.1E-01	1.7E-01	Sample et al. (1998b)[h]
Vanadium	NA	27	5.50E-03	1.5E-01	Baes et al. (1984)	4.2E-02	1.1E+00	Sample et al. (1998a)[b]	1.4E-05	3.7E-04	Baes et al. (1984)[f]
Zinc	NA	18113	Regression[a]	1.2E+03	Efroymson et al. (2001)[a]	Regression[d]	2.2E+03	Sample et al. (1999a)[d]	Regression[g]	1.8E+02	Sample et al. (1998b)[g]
Organics											
DDT	6.53	0.333	1.35E-01	4.52E-02	USEPA (2005)[n]	Regression[n]	3.2E+00	USEPA (2005)[d]	Regression[p]	7.6E+00	USEPA (2005)[p]
Methoxychlor	5.08	0.093	5.25E-01	4.88E-02	USEPA (2005)[n]	3.86E+00	3.58E-01	USEPA (2005)[o]	3.6E-02	1.3E-02	Travis and Arms (1988)[o]
Other											
Cyanide	NA	18	1.00E+00	1.8E+01	Assumption[i]	1.0E+00	1.8E+01	Assumption[i]	1.0E+00	1.8E+01	Assumption[i]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

c. Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Analyte	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.68	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)
PCBs	1.41	1.36	Sample et al. (1999) based on data for TCDD
DDT	2.1247	0.8689	USEPA (2005)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor

n. Soil-to-plant BAF based on K_{ow} model for non-ionic organic compounds (rinsed foliage data) provided in USEPA (2005), where: log BAF = -0.4057(log K_{ow}) + 1.781

o. Estimation of soil-to-earthworm bioaccumulation factors for non-ionic organic compounds based on USEPA (2005)

p. Bioconcentration factor (BCF) from diet to tissue based on log K_{ow}, where log[tissue] = -7.6 + log K_{ow} * 12 (average correction factor of lactating and non-lactating animals); BCF multiplied by soil invertebrate tissue concentration for a conservative estimation

q. Bioconcentration factor (BCF) from diet to tissue based on regression models from USEPA (2005), ln([tissue]) = B0 + B1(ln[diet]), where diet is the estimated concentrations in soil invertebrates and slopes (B1) and intercepts (B0) are as follows.

Analyte	B0	B1	Data Source for Model
DDT	1.1788	0.7254	USEPA (2005)

NA. Data not available

TABLE F-8
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	273	Regression[a]	7.6E+00	USEPA (2003a)[a]	1.0E+00	2.7E+02	Assumption[c]	2.0E-04	5.5E-02	Baes et al. (1984)[f]
Arsenic	433	Regression[a]	4.1E+00	Efroymson et al. (2001)[a]	Regression[d]	1.7E+01	Sample et al. (1999a)[d]	Regression[g]	1.1E+00	Sample et al. (1998b)[g]
Barium	250	1.50E-01	3.8E+01	Baes et al. (1984)	9.1E-02	2.3E+01	Sample et al. (1998)[b]	5.7E-02	1.4E+01	Sample et al. (1998b)[h]
Cadmium	3660	Regression[a]	5.6E+01	Efroymson et al. (2001)[a]	Regression[d]	3.6E+03	Neuhauser et al. (1995)	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Chromium	42.3	7.50E-03	3.2E-01	Baes et al. (1984)	3.1E-01	1.3E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Cobalt	50.8	2.00E-02	1.0E+00	Baes et al. (1984)	1.2E-01	6.2E+00	Sample et al. (1998)[b]	2.1E-02	1.0E+00	Sample et al. (1998b)[h]
Copper	4470	Regression[a]	5.2E+01	Efroymson et al. (2001)[a]	Regression[d]	4.91E+01	Sample et al. (1999a)[d]	Regression[g]	3.7E+01	Sample et al. (1998b)[g]
Lead	124000	Regression[a]	1.9E+02	Efroymson et al. (2001)[a]	Regression[d]	1.1E+04	Sample et al. (1999a)[d]	Regression[g]	2.4E+02	Sample et al. (1998b)[g]
Manganese	5690	2.50E-01	1.4E+03	Baes et al. (1984)	Regression[d]	1.6E+02	Sample et al. (1999a)[d]	1.0E-04	5.7E-01	Baes et al. (1984)[f]
Mercury	147	Regression[a]	5.4E+00	Efroymson et al. (2001)[a]	Regression[d]	5.6E+00	Sample et al. (1999a)[d]	5.4E-02	8.0E+00	Sample et al. (1998b)[h]
Nickel	26.7	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	1.1E+00	2.8E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Selenium	86.3	Regression[a]	6.8E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+01	Sample et al. (1999a)[d]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Silver	405	4.00E-01	1.6E+02	Baes et al. (1984)	2.0E+00	8.3E+02	Sample et al. (1998)[b]	1.2E-03	4.9E-01	Baes et al. (1984)[f]
Thallium	1.1	4.00E-03	4.4E-03	Baes et al. (1984)	1.0E+00	1.1E+00	Assumption[c]	1.1E-01	1.2E-01	Sample et al. (1998b)[h]
Vanadium	29.8	5.50E-03	1.6E-01	Baes et al. (1984)	4.2E-02	1.3E+00	Sample et al. (1998a)[b]	1.4E-05	4.1E-04	Baes et al. (1984)[f]
Zinc	105000	Regression[a]	3.1E+03	Efroymson et al. (2001)[a]	Regression[d]	3.8E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b, Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c, Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil])
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i, EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j, CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items

TABLE F-9
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[1] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	32.7	Regression[a]	1.0E+00	USEPA (2003a)[e]	1.0E+00	3.3E+01	Assumption[c]	2.0E-04	6.5E-03	Baes et al. (1984)[f]
Arsenic	45.8	Regression[a]	1.2E+00	Efroymson et al. (2001)[e]	Regression[d]	3.5E+00	Sample et al. (1999a)[d]	Regression[g]	1.8E-01	Sample et al. (1998b)[g]
Barium	79.50	1.50E-01	1.2E+01	Baes et al. (1984)	9.1E-02	7.2E+00	Sample et al. (1998)[b]	5.7E-02	4.5E+00	Sample et al. (1998b)[h]
Cadmium	167	Regression[a]	1.0E+01	Efroymson et al. (2001)[e]	Regression[d]	4.8E+02	Neuhauser et al. (1995)	Regression[g]	3.9E+00	Sample et al. (1998b)[g]
Chromium	12.53	7.50E-03	9.4E-02	Baes et al. (1984)	3.1E-01	3.8E+00	Sample et al. (1998a)[e]	Regression[g]	1.5E+00	Sample et al. (1998b)[g]
Cobalt	5.87	2.00E-02	1.2E-01	Baes et al. (1984)	1.2E-01	7.2E-01	Sample et al. (1998)[b]	2.1E-02	1.2E-01	Sample et al. (1998b)[h]
Copper	259	Regression[a]	1.7E+01	Efroymson et al. (2001)[e]	Regression[d]	2.31E+01	Sample et al. (1999a)[d]	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Lead	6001	Regression[a]	3.5E+01	Efroymson et al. (2001)[e]	Regression[d]	9.3E+02	Sample et al. (1999a)[d]	Regression[g]	4.9E+01	Sample et al. (1998b)[g]
Manganese	548.75	2.50E-01	1.4E+02	Baes et al. (1984)	Regression[d]	3.3E+01	Sample et al. (1999a)[d]	1.0E-04	5.5E-02	Baes et al. (1984)[f]
Mercury	8.58	Regression[a]	1.2E+00	Efroymson et al. (2001)[e]	Regression[d]	2.2E+00	Sample et al. (1999a)[d]	5.4E-02	4.7E-01	Sample et al. (1998b)[h]
Nickel	7.57	Regression[a]	5.0E-01	Efroymson et al. (2001)[e]	1.1E+00	8.0E+00	Sample et al. (1998a)[e]	Regression[g]	2.0E+00	Sample et al. (1998b)[g]
Selenium	7.28	Regression[a]	4.5E+00	Efroymson et al. (2001)[e]	Regression[d]	4.0E+00	Sample et al. (1999a)[d]	Regression[g]	1.4E+00	Sample et al. (1998b)[g]
Silver	19.8	4.00E-01	7.9E+00	Baes et al. (1984)	2.0E+00	4.0E+01	Sample et al. (1998)[b]	1.2E-03	2.4E-02	Baes et al. (1984)[f]
Thallium	0.47	4.00E-03	1.9E-03	Baes et al. (1984)	1.0E+00	4.7E-01	Assumption[c]	1.1E-01	5.2E-02	Sample et al. (1998b)[h]
Vanadium	9.23	5.50E-03	5.1E-02	Baes et al. (1984)	4.2E-02	3.9E-01	Sample et al. (1998a)[e]	1.4E-05	1.3E-04	Baes et al. (1984)[f]
Zinc	6452	Regression[a]	6.6E+02	Efroymson et al. (2001)[e]	Regression[d]	1.5E+03	Sample et al. (1999a)[d]	Regression[g]	1.7E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]). Slopes (B1) and intercepts (B0) are as follows

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor

i. EPC dataset does not include results from samples SL-447 or SL-448, these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit

TABLE F-10
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS FOR BURROWING RECEPTORS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	400	Regression[a]	1.1E+01	USEPA (2003a)[a]	1.0E+00	4.0E+02	Assumption[c]	2.0E-04	8.0E-02	Baes et al. (1984)[f]
Arsenic	433	Regression[a]	4.1E+00	Efroymson et al. (2001)[a]	Regression[d]	1.7E+01	Sample et al. (1999a)[d]	Regression[g]	1.1E+00	Sample et al. (1998b)[g]
Barium	390	1.50E-01	5.9E+01	Baes et al. (1984)	9.1E-02	3.5E+01	Sample et al. (1998)[b]	5.7E-02	2.2E+01	Sample et al. (1998b)[h]
Cadmium	3660	Regression[a]	5.6E+01	Efroymson et al. (2001)[a]	Regression[d]	3.6E+03	Neuhauser et al. (1995)	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Chromium	42.3	7.50E-03	3.2E-01	Baes et al. (1984)	3.1E-01	1.3E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Cobalt	50.8	2.00E-02	1.0E+00	Baes et al. (1984)	1.2E-01	6.2E+00	Sample et al. (1998)[b]	2.1E-02	1.0E+00	Sample et al. (1998b)[h]
Copper	4470	Regression[a]	5.2E+01	Efroymson et al. (2001)[a]	Regression[d]	4.91E+01	Sample et al. (1999a)[d]	Regression[g]	3.7E+01	Sample et al. (1998b)[g]
Lead	124000	Regression[a]	1.9E+02	Efroymson et al. (2001)[a]	Regression[d]	1.1E+04	Sample et al. (1999a)[d]	Regression[g]	2.4E+02	Sample et al. (1998b)[g]
Manganese	5690	2.50E-01	1.4E+03	Baes et al. (1984)	Regression[d]	1.6E+02	Sample et al. (1999a)[d]	1.0E-04	5.7E-01	Baes et al. (1984)[f]
Mercury	147	Regression[a]	5.4E+00	Efroymson et al. (2001)[a]	Regression[d]	5.6E+00	Sample et al. (1999a)[d]	5.4E-02	8.0E+00	Sample et al. (1998b)[h]
Nickel	26.7	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	1.1E+00	2.8E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Selenium	86.3	Regression[a]	6.8E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+01	Sample et al. (1999a)[d]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Silver	405	4.00E-01	1.6E+02	Baes et al. (1984)	2.0E+00	8.3E+02	Sample et al. (1998)[b]	1.2E-03	4.9E-01	Baes et al. (1984)[f]
Thallium	3.09	4.00E-03	1.2E-02	Baes et al. (1984)	1.0E+00	3.1E+00	Assumption[c]	1.1E-01	3.5E-01	Sample et al. (1998b)[h]
Vanadium	29.8	5.50E-03	1.6E-01	Baes et al. (1984)	4.2E-02	1.3E+00	Sample et al. (1998a)[b]	1.4E-05	4.1E-04	Baes et al. (1984)[f]
Zinc	105000	Regression[a]	3.1E+03	Efroymson et al. (2001)[a]	Regression[d]	3.8E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b, Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c, Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed.

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i, EPC dataset does not include results from samples SL-447 or SL-448, these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j, CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items.

TABLE F-11
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS FOR BURROWING RECEPTORS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	41.0	Regression[a]	1.3E+00	USEPA (2003a)[e]	1.0E+00	4.1E+01	Assumption[c]	2.0E-04	8.2E-03	Baes et al. (1984)[f]
Arsenic	40.1	Regression[a]	1.1E+00	Efroymson et al. (2001)[e]	Regression[d]	3.2E+00	Sample et al. (1999a)[d]	Regression[g]	1.6E-01	Sample et al. (1998b)[g]
Barium	74.7	1.50E-01	1.1E+01	Baes et al. (1984)	9.1E-02	6.8E+00	Sample et al. (1998)[b]	5.7E-02	4.2E+00	Sample et al. (1998b)[h]
Cadmium	167	Regression[a]	1.0E+01	Efroymson et al. (2001)[e]	Regression[d]	4.8E+02	Neuhauser et al. (1995)	Regression[g]	3.9E+00	Sample et al. (1998b)[g]
Chromium	13.0	7.50E-03	9.7E-02	Baes et al. (1984)	3.1E-01	4.0E+00	Sample et al. (1998a)[e]	Regression[g]	1.5E+00	Sample et al. (1998b)[g]
Cobalt	4.86	2.00E-02	9.7E-02	Baes et al. (1984)	1.2E-01	5.9E-01	Sample et al. (1998)[b]	2.1E-02	1.0E-01	Sample et al. (1998b)[h]
Copper	265	Regression[a]	1.7E+01	Efroymson et al. (2001)[e]	Regression[d]	2.33E+01	Sample et al. (1999a)[d]	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Lead	5267	Regression[a]	3.2E+01	Efroymson et al. (2001)[e]	Regression[d]	8.4E+02	Sample et al. (1999a)[d]	Regression[g]	4.6E+01	Sample et al. (1998b)[g]
Manganese	376	2.50E-01	9.4E+01	Baes et al. (1984)	Regression[d]	2.5E+01	Sample et al. (1999a)[d]	1.0E-04	3.8E-02	Baes et al. (1984)[f]
Mercury	8.70	Regression[a]	1.2E+00	Efroymson et al. (2001)[e]	Regression[d]	2.2E+00	Sample et al. (1999a)[d]	5.4E-02	4.7E-01	Sample et al. (1998b)[h]
Nickel	7.05	Regression[a]	4.7E-01	Efroymson et al. (2001)[e]	1.1E+00	7.5E+00	Sample et al. (1998a)[e]	Regression[g]	1.9E+00	Sample et al. (1998b)[g]
Selenium	7.57	Regression[a]	4.7E+00	Efroymson et al. (2001)[e]	Regression[d]	4.1E+00	Sample et al. (1999a)[d]	Regression[g]	1.4E+00	Sample et al. (1998b)[g]
Silver	17.2	4.00E-01	6.9E+00	Baes et al. (1984)	2.0E+00	3.5E+01	Sample et al. (1998)[b]	1.2E-03	2.1E-02	Baes et al. (1984)[f]
Thallium	0.48	4.00E-03	1.9E-03	Baes et al. (1984)	1.0E+00	4.8E-01	Assumption[c]	1.1E-01	5.4E-02	Sample et al. (1998b)[h]
Vanadium	8.63	5.50E-03	4.7E-02	Baes et al. (1984)	4.2E-02	3.6E-01	Sample et al. (1998a)[b]	1.4E-05	1.2E-04	Baes et al. (1984)[f]
Zinc	6537	Regression[a]	6.6E+02	Efroymson et al. (2001)[e]	Regression[d]	1.5E+03	Sample et al. (1999a)[d]	Regression[g]	1.7E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

TABLE F-12
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA WITHOUT RNOF-05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	152	Regression[a]	4.4E+00	USEPA (2003a)[a]	1.0E+00	1.5E+02	Assumption[c]	2.0E-04	3.0E-02	Baes et al. (1984)[f]
Arsenic	145	Regression[a]	2.2E+00	Efroymson et al. (2001)[a]	Regression[d]	7.9E+00	Sample et al. (1999a)[d]	Regression[g]	4.6E-01	Sample et al. (1998b)[g]
Barium	214	1.50E-01	3.2E+01	Baes et al. (1984)	9.1E-02	1.9E+01	Sample et al. (1998)[b]	5.7E-02	1.2E+01	Sample et al. (1998b)[h]
Cadmium	81.4	Regression[a]	7.0E+00	Efroymson et al. (2001)[a]	Regression[d]	3.0E+02	Neuhauser et al. (1995)	Regression[g]	2.6E+00	Sample et al. (1998b)[g]
Chromium	27.5	7.50E-03	2.1E-01	Baes et al. (1984)	3.1E-01	8.4E+00	Sample et al. (1998a)[e]	Regression[g]	2.6E+00	Sample et al. (1998b)[g]
Cobalt	5.8	2.00E-02	1.2E-01	Baes et al. (1984)	1.2E-01	7.1E-01	Sample et al. (1998)[b]	2.1E-02	1.2E-01	Sample et al. (1998b)[h]
Copper	359	Regression[a]	1.9E+01	Efroymson et al. (2001)[a]	Regression[d]	2.52E+01	Sample et al. (1999a)[d]	Regression[g]	2.3E+01	Sample et al. (1998b)[g]
Lead	8650	Regression[a]	4.2E+01	Efroymson et al. (2001)[a]	Regression[d]	1.3E+03	Sample et al. (1999a)[d]	Regression[g]	5.9E+01	Sample et al. (1998b)[g]
Manganese	447	2.50E-01	1.1E+02	Baes et al. (1984)	Regression[d]	2.8E+01	Sample et al. (1999a)[d]	1.0E-04	4.5E-02	Baes et al. (1984)[f]
Mercury	16.5	Regression[a]	1.7E+00	Efroymson et al. (2001)[a]	Regression[d]	2.7E+00	Sample et al. (1999a)[d]	5.4E-02	9.0E-01	Sample et al. (1998b)[h]
Nickel	26.7	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	1.1E+00	2.8E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Selenium	24.6	Regression[a]	1.7E+01	Efroymson et al. (2001)[a]	Regression[d]	9.6E+00	Sample et al. (1999a)[d]	Regression[g]	2.2E+00	Sample et al. (1998b)[g]
Silver	26.7	4.00E-01	1.1E+01	Baes et al. (1984)	2.0E+00	5.5E+01	Sample et al. (1998)[b]	1.2E-03	3.2E-02	Baes et al. (1984)[f]
Thallium	0.44	4.00E-03	1.8E-03	Baes et al. (1984)	1.0E+00	4.4E-01	Assumption[c]	1.1E-01	4.9E-02	Sample et al. (1998b)[h]
Vanadium	23.9	5.50E-03	1.3E-01	Baes et al. (1984)	4.2E-02	1.0E+00	Sample et al. (1998a)[b]	1.4E-05	3.3E-04	Baes et al. (1984)[f]
Zinc	10400	Regression[a]	8.6E+02	Efroymson et al. (2001)[a]	Regression[d]	1.8E+03	Sample et al. (1999a)[d]	Regression[g]	1.7E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j. CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items.

TABLE F-13
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA WITHOUT RNOF-05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	13 7	Regression[a]	4 6E-01	USEPA (2003a)[a]	1.0E+00	1.4E+01	Assumption[c]	2.0E-04	2.7E-03	Baes et al. (1984)[f]
Arsenic	24 8	Regression[a]	8.3E-01	Efroymson et al (2001)[a]	Regression[d]	2.3E+00	Sample et al (1999a)[d]	Regression[g]	1.1E-01	Sample et al. (1998b)[g]
Barium	66.3	1 50E-01	9.9E+00	Baes et al (1984)	9.1E-02	6.0E+00	Sample et al. (1998)[b]	5 7E-02	3.8E+00	Sample et al. (1998b)[h]
Cadmium	15 2	Regression[a]	2.8E+00	Efroymson et al. (2001)[a]	Regression[d]	9.8E+01	Neuhauser et al. (1995)	Regression[g]	1.0E+00	Sample et al. (1998b)[g]
Chromium	10.6	7.50E-03	7 9E-02	Baes et al. (1984)	3.1E-01	3.2E+00	Sample et al. (1998a)[e]	Regression[g]	1.3E+00	Sample et al. (1998b)[g]
Cobalt	1.95	2.00E-02	3 9E-02	Baes et al. (1984)	1.2E-01	2.4E-01	Sample et al. (1998)[b]	2.1E-02	4 0E-02	Sample et al. (1998b)[h]
Copper	74.4	Regression[a]	1.0E+01	Efroymson et al. (2001)[a]	Regression[d]	1.67E+01	Sample et al (1999a)[d]	Regression[g]	1 8E+01	Sample et al (1998b)[g]
Lead	1096	Regression[a]	1.3E+01	Efroymson et al (2001)[a]	Regression[d]	2 3E+02	Sample et al (1999a)[d]	Regression[g]	2 0E+01	Sample et al. (1998b)[g]
Manganese	92.34	2 50E-01	2.3E+01	Baes et al. (1984)	Regression[d]	9.8E+00	Sample et al (1999a)[d]	1 0E-04	9.2E-03	Baes et al. (1984)[f]
Mercury	2 30	Regression[a]	5.8E-01	Efroymson et al. (2001)[a]	Regression[d]	1 4E+00	Sample et al. (1999a)[d]	5.4E-02	1.3E-01	Sample et al. (1998b)[h]
Nickel	7 16	Regression[a]	4.8E-01	Efroymson et al. (2001)[a]	1.1E+00	7.6E+00	Sample et al (1998a)[e]	Regression[g]	2.0E+00	Sample et al. (1998b)[g]
Selenium	3 90	Regression[a]	2.3E+00	Efroymson et al (2001)[a]	Regression[d]	2.5E+00	Sample et al. (1999a)[d]	Regression[g]	1.1E+00	Sample et al. (1998b)[g]
Silver	3.65	4.00E-01	1 5E+00	Baes et al. (1984)	2.0E+00	7 5E+00	Sample et al. (1998)[b]	1.2E-03	4 4E-03	Baes et al. (1984)[f]
Thallium	0 45	4.00E-03	1.8E-03	Baes et al. (1984)	1.0E+00	4 5E-01	Assumption[c]	1.1E-01	5.0E-02	Sample et al. (1998b)[h]
Vanadium	7.42	5 50E-03	4 1E-02	Baes et al (1984)	4.2E-02	3.1E-01	Sample et al. (1998a)[b]	1.4E-05	1.0E-04	Baes et al. (1984)[f]
Zinc	2198	Regression[a]	3.6E+02	Efroymson et al. (2001)[a]	Regression[d]	1.1E+03	Sample et al. (1999a)[d]	Regression[g]	1.5E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3 233	0 937	USEPA 2003a
Arsenic	-1 99	0 56	Efroymson et al (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0 39	Efroymson et al (2001)
Lead	-1 33	0 56	Efroymson et al (2001)
Mercury	-1	0 54	Efroymson et al. (2001)
Nickel	-2.22	0 75	Efroymson et al. (2001)
Selenium	-0 68	1 1	Efroymson et al (2001)
Zinc	1 58	0 56	Efroymson et al (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1 42	0 7	Sample et al (1999)
Cadmium	1.21	0 66	Neuhauser et al (1995)
Copper	1 67	0.26	Sample et al. (1999)
Lead	-0 21	0 81	Sample et al (1999)
Mercury	-0.078	0 33	Sample et al. (1999)
Manganese	-0 8	0 68	Sample et al (1999)
Selenium	-0.075	0 73	Sample et al (1999)
Zinc	4 44	0 33	Sample et al (1999)

e. 90th percentile of UFs reported in Sample et al (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4 8471	0 8188
Cadmium	-1 5383	0 566
Chromium	-1 4599	0 7338
Copper	2 1042	0 1783
Iron	-0 2879	0 5969
Lead	-0 6114	0 5181
Nickel	-0.2462	0 4658
Selenium	-0 4158	0 3764
Zinc	4.4713	0 0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448, these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

TABLE F-14
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA WITHOUT RNOF-05 (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	273	Regression[a]	7.6E+00	USEPA (2003a)[a]	1.0E+00	2.7E+02	Assumption[c]	2.0E-04	5.5E-02	Baes et al. (1984)[f]
Arsenic	433	Regression[a]	4.1E+00	Efroymson et al. (2001)[a]	Regression[d]	1.7E+01	Sample et al. (1999a)[d]	Regression[g]	1.1E+00	Sample et al (1998b)[g]
Barium	250	1.50E-01	3.8E+01	Baes et al. (1984)	9.1E-02	2.3E+01	Sample et al. (1998)[b]	5.7E-02	1.4E+01	Sample et al (1998b)[h]
Cadmium	3660	Regression[a]	5 6E+01	Efroymson et al. (2001)[a]	Regression[d]	3.6E+03	Neuhauser et al (1995)	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Chromium	42.3	7.50E-03	3.2E-01	Baes et al. (1984)	3.1E-01	1 3E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Cobalt	50.8	2.00E-02	1.0E+00	Baes et al. (1984)	1.2E-01	6.2E+00	Sample et al. (1998)[b]	2.1E-02	1.0E+00	Sample et al. (1998b)[h]
Copper	4470	Regression[a]	5.2E+01	Efroymson et al. (2001)[a]	Regression[d]	4.91E+01	Sample et al. (1999a)[d]	Regression[g]	3.7E+01	Sample et al. (1998b)[g]
Lead	124000	Regression[a]	1.9E+02	Efroymson et al. (2001)[a]	Regression[d]	1.1E+04	Sample et al. (1999a)[d]	Regression[g]	2 4E+02	Sample et al. (1998b)[g]
Manganese	5690	2.50E-01	1.4E+03	Baes et al. (1984)	Regression[d]	1.6E+02	Sample et al. (1999a)[d]	1.0E-04	5.7E-01	Baes et al. (1984)[f]
Mercury	147	Regression[a]	5.4E+00	Efroymson et al. (2001)[a]	Regression[d]	5.6E+00	Sample et al. (1999a)[d]	5 4E-02	8.0E+00	Sample et al. (1998b)[h]
Nickel	26.7	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	1.1E+00	2.8E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Selenium	86.3	Regression[a]	6.8E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+01	Sample et al. (1999a)[d]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Silver	405	4.00E-01	1.6E+02	Baes et al. (1984)	2.0E+00	8.3E+02	Sample et al. (1998)[b]	1.2E-03	4.9E-01	Baes et al. (1984)[f]
Thallium	3.09	4 00E-03	1.2E-02	Baes et al. (1984)	1.0E+00	3.1E+00	Assumption[c]	1.1E-01	3.5E-01	Sample et al. (1998b)[h]
Vanadium	29.8	5.50E-03	1.6E-01	Baes et al. (1984)	4.2E-02	1.3E+00	Sample et al. (1998a)[b]	1 4E-05	4.1E-04	Baes et al. (1984)[f]
Zinc	105000	Regression[a]	3.1E+03	Efroymson et al. (2001)[a]	Regression[d]	3.8E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0 937	USEPA 2003a
Arsenic	-1 99	0.56	Efroymson et al (2001)
Cadmium	-0 48	0 55	Efroymson et al (2001)
Copper	0 67	0 39	Efroymson et al (2001)
Lead	-1.33	0 56	Efroymson et al (2001)
Mercury	-1	0 54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al (2001)
Selenium	-0 68	1 1	Efroymson et al. (2001)
Zinc	1 58	0 56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c, Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).

Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0 7	Sample et al (1999)
Cadmium	1.21	0.66	Neuhauser et al (1995)
Copper	1.67	0 26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al (1999)
Mercury	-0.078	0 33	Sample et al (1999)
Manganese	-0.8	0.68	Sample et al (1999)
Selenium	-0 075	0.73	Sample et al. (1999)
Zinc	4 44	0 33	Sample et al (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4 8471	0 8188
Cadmium	-1.5383	0 566
Chromium	-1.4599	0 7338
Copper	2 1042	0.1783
Iron	-0 2879	0.5969
Lead	-0 6114	0 5181
Nickel	-0 2462	0.4658
Selenium	-0 4158	0 3764
Zinc	4 4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i, EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j, CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items

TABLE F-15
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA WITHOUT RNOF-05 (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	25.6	Regression[a]	8.2E-01	USEPA (2003a)[e]	1.0E+00	2.6E+01	Assumption[c]	2.0E-04	5.1E-03	Baes et al (1984)[f]
Arsenic	38.0	Regression[a]	1.0E+00	Efroymson et al. (2001)[e]	Regression[d]	3.1E+00	Sample et al (1999a)[d]	Regression[g]	1.5E-01	Sample et al (1998b)[g]
Barium	62.6	1.50E-01	9.4E+00	Baes et al. (1984)	9.1E-02	5.7E+00	Sample et al. (1998)[b]	5.7E-02	3.5E+00	Sample et al. (1998b)[h]
Cadmium	130.5	Regression[a]	9.0E+00	Efroymson et al. (2001)[e]	Regression[d]	4.0E+02	Neuhauser et al (1995)	Regression[g]	3.4E+00	Sample et al. (1998b)[g]
Chromium	11.9	7.50E-03	8.9E-02	Baes et al. (1984)	3.1E-01	3.6E+00	Sample et al. (1998a)[e]	Regression[g]	1.4E+00	Sample et al. (1998b)[g]
Cobalt	4.53	2.00E-02	9.1E-02	Baes et al. (1984)	1.2E-01	5.5E-01	Sample et al. (1998)[b]	2.1E-02	9.3E-02	Sample et al. (1998b)[h]
Copper	216.9	Regression[a]	1.6E+01	Efroymson et al. (2001)[e]	Regression[d]	2.21E+01	Sample et al. (1999a)[d]	Regression[g]	2.1E+01	Sample et al. (1998b)[g]
Lead	4583	Regression[a]	3.0E+01	Efroymson et al. (2001)[e]	Regression[d]	7.5E+02	Sample et al. (1999a)[d]	Regression[g]	4.3E+01	Sample et al. (1998b)[g]
Manganese	341	2.50E-01	8.5E+01	Baes et al. (1984)	Regression[d]	2.4E+01	Sample et al. (1999a)[d]	1.0E-04	3.4E-02	Baes et al. (1984)[f]
Mercury	8.07	Regression[a]	1.1E+00	Efroymson et al. (2001)[e]	Regression[d]	2.2E+00	Sample et al (1999a)[d]	5.4E-02	4.4E-01	Sample et al. (1998b)[h]
Nickel	7.10	Regression[a]	4.7E-01	Efroymson et al. (2001)[e]	1.1E+00	7.5E+00	Sample et al. (1998a)[e]	Regression[g]	1.9E+00	Sample et al. (1998b)[g]
Selenium	7.01	Regression[a]	4.3E+00	Efroymson et al. (2001)[e]	Regression[d]	3.8E+00	Sample et al. (1999a)[d]	Regression[g]	1.4E+00	Sample et al. (1998b)[g]
Silver	15.32	4.00E-01	6.1E+00	Baes et al. (1984)	2.0E+00	3.1E+01	Sample et al. (1998)[b]	1.2E-03	1.8E-02	Baes et al (1984)[f]
Thallium	0.47	4.00E-03	1.9E-03	Baes et al. (1984)	1.0E+00	4.7E-01	Assumption[c]	1.1E-01	5.3E-02	Sample et al. (1998b)[h]
Vanadium	8.69	5.50E-03	4.8E-02	Baes et al. (1984)	4.2E-02	3.7E-01	Sample et al. (1998a)[b]	1.4E-05	1.2E-04	Baes et al. (1984)[f]
Zinc	6008	Regression[a]	6.3E+02	Efroymson et al. (2001)[e]	Regression[d]	1.5E+03	Sample et al (1999a)[d]	Regression[g]	1.7E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al (2001)
Copper	0.67	0.39	Efroymson et al (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

c. Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e. 90th percentile of UFs reported in Sample et al (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

TABLE F-16
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	248	Regression[a]	6.9E+00	USEPA (2003a)[b]	1.0E+00	2.5E+02	Assumption[c]	2.0E-04	5.0E-02	Baes et al. (1984)[f]
Arsenic	433	Regression[a]	4.1E+00	Efroymson et al. (2001)[a]	Regression[d]	1.7E+01	Sample et al. (1999a)[d]	Regression[g]	1.1E+00	Sample et al. (1998b)[g]
Barium	250	1.50E-01	3.8E+01	Baes et al. (1984)	9.1E-02	2.3E+01	Sample et al. (1998)[b]	5.7E-02	1.4E+01	Sample et al. (1998b)[h]
Cadmium	3660	Regression[a]	5.6E+01	Efroymson et al. (2001)[a]	Regression[d]	3.6E+03	Neuhauser et al. (1995)	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Chromium	42.3	7.50E-03	3.2E-01	Baes et al. (1984)	3.1E-01	1.3E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Cobalt	50.8	2.00E-02	1.0E+00	Baes et al. (1984)	1.2E-01	6.2E+00	Sample et al. (1998)[b]	2.1E-02	1.0E+00	Sample et al. (1998b)[h]
Copper	4470	Regression[a]	5.2E+01	Efroymson et al. (2001)[a]	Regression[d]	4.91E+01	Sample et al. (1999a)[d]	Regression[g]	3.7E+01	Sample et al. (1998b)[g]
Lead	124000	Regression[a]	1.9E+02	Efroymson et al. (2001)[a]	Regression[d]	1.1E+04	Sample et al. (1999a)[d]	Regression[g]	2.4E+02	Sample et al. (1998b)[g]
Manganese	5690	2.50E-01	1.4E+03	Baes et al. (1984)	Regression[d]	1.6E+02	Sample et al. (1999a)[d]	1.0E-04	5.7E-01	Baes et al. (1984)[f]
Mercury	147	Regression[a]	5.4E+00	Efroymson et al. (2001)[a]	Regression[d]	5.6E+00	Sample et al. (1999a)[d]	5.4E-02	8.0E+00	Sample et al. (1998b)[h]
Nickel	26.7	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	1.1E+00	2.8E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Selenium	86.3	Regression[a]	6.8E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+01	Sample et al. (1999a)[d]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Silver	405	4.00E-01	1.6E+02	Baes et al. (1984)	2.0E+00	8.3E+02	Sample et al. (1998)[b]	1.2E-03	4.9E-01	Baes et al. (1984)[f]
Thallium	1.1	4.00E-03	4.4E-03	Baes et al. (1984)	1.0E+00	1.1E+00	Assumption[c]	1.1E-01	1.2E-01	Sample et al. (1998b)[h]
Vanadium	29.8	5.50E-03	1.6E-01	Baes et al. (1984)	4.2E-02	1.3E+00	Sample et al. (1998a)[b]	1.4E-05	4.1E-04	Baes et al. (1984)[f]
Zinc	105000	Regression[a]	3.1E+03	Efroymson et al. (2001)[a]	Regression[d]	3.8E+03	Sample et al. (1999a)[d]	Regression[g]	2.1E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c, Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j. CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items.

TABLE F-17
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	37.7	Regression[a]	1.2E+00	USEPA (2003a)[a]	1.0E+00	3.8E+01	Assumption[c]	2.0E-04	7.5E-03	Baes et al. (1984)[f]
Arsenic	73.4	Regression[a]	1.5E+00	Efroymson et al. (2001)[a]	Regression[d]	4.9E+00	Sample et al (1999a)[d]	Regression[g]	2.6E-01	Sample et al. (1998b)[g]
Barium	112.46	1.50E-01	1.7E+01	Baes et al (1984)	9.1E-02	1.0E+01	Sample et al. (1998)[b]	5.7E-02	6.4E+00	Sample et al. (1998b)[h]
Cadmium	537	Regression[a]	2.0E+01	Efroymson et al. (2001)[a]	Regression[d]	1.0E+03	Neuhauser et al. (1995)	Regression[g]	7.5E+00	Sample et al (1998b)[g]
Chromium	14.16	7.50E-03	1.1E-01	Baes et al. (1984)	3.1E-01	4.3E+00	Sample et al (1998a)[e]	Regression[g]	1.6E+00	Sample et al. (1998b)[g]
Cobalt	9 47	2.00E-02	1.9E-01	Baes et al. (1984)	1.2E-01	1.2E+00	Sample et al. (1998)[b]	2 1E-02	1.9E-01	Sample et al. (1998b)[h]
Copper	738	Regression[a]	2.6E+01	Efroymson et al. (2001)[a]	Regression[d]	3.05E+01	Sample et al (1999a)[d]	Regression[g]	2 7E+01	Sample et al (1998b)[g]
Lead	18453	Regression[a]	6.5E+01	Efroymson et al. (2001)[a]	Regression[d]	2.3E+03	Sample et al. (1999a)[d]	Regression[g]	8.8E+01	Sample et al. (1998b)[g]
Manganese	938.03	2.50E-01	2.3E+02	Baes et al. (1984)	Regression[d]	4 7E+01	Sample et al. (1999a)[d]	1 0E-04	9.4E-02	Baes et al. (1984)[f]
Mercury	23.40	Regression[a]	2 0E+00	Efroymson et al. (2001)[a]	Regression[d]	3.1E+00	Sample et al. (1999a)[d]	5.4E-02	1.3E+00	Sample et al. (1998b)[h]
Nickel	11 03	Regression[a]	6.6E-01	Efroymson et al. (2001)[a]	1.1E+00	1.2E+01	Sample et al. (1998a)[e]	Regression[g]	2.4E+00	Sample et al. (1998b)[g]
Selenium	16.59	Regression[a]	1.1E+01	Efroymson et al. (2001)[a]	Regression[d]	7 2E+00	Sample et al. (1999a)[d]	Regression[g]	1.9E+00	Sample et al. (1998b)[g]
Silver	61.0	4 00E-01	2.4E+01	Baes et al. (1984)	2.0E+00	1.2E+02	Sample et al. (1998)[b]	1.2E-03	7 3E-02	Baes et al. (1984)[f]
Thallium	0 32	4.00E-03	1.3E-03	Baes et al. (1984)	1.0E+00	3.2E-01	Assumption[c]	1.1E-01	3.6E-02	Sample et al (1998b)[h]
Vanadium	12.88	5.50E-03	7.1E-02	Baes et al. (1984)	4.2E-02	5.4E-01	Sample et al. (1998a)[b]	1.4E-05	1.8E-04	Baes et al. (1984)[f]
Zinc	18105	Regression[a]	1.2E+03	Efroymson et al. (2001)[a]	Regression[d]	2.2E+03	Sample et al. (1999a)[d]	Regression[g]	1.8E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3 233	0 937	USEPA 2003a
Arsenic	-1 99	0 56	Efroymson et al (2001)
Cadmium	-0.48	0.55	Efroymson et al (2001)
Copper	0 67	0 39	Efroymson et al (2001)
Lead	-1.33	0.56	Efroymson et al (2001)
Mercury	-1	0 54	Efroymson et al. (2001)
Nickel	-2.22	0 75	Efroymson et al. (2001)
Selenium	-0 68	1.1	Efroymson et al. (2001)
Zinc	1 58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.
c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.
d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al (1999)
Cadmium	1 21	0 66	Neuhauser et al. (1995)
Copper	1 67	0.26	Sample et al. (1999)
Lead	-0 21	0.81	Sample et al (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0 68	Sample et al. (1999)
Selenium	-0 075	0 73	Sample et al. (1999)
Zinc	4 44	0 33	Sample et al (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.
f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)
g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4 8471	0 8188
Cadmium	-1 5383	0 566
Chromium	-1 4599	0 7338
Copper	2 1042	0 1783
Iron	-0.2879	0.5969
Lead	-0 6114	0 5181
Nickel	-0 2462	0 4658
Selenium	-0 4158	0 3764
Zinc	4 4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.
i, EPC dataset does not include results from samples SL-447 or SL-448: these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit

TABLE F-18
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS FOR BURROWING RECEPTORS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA 25-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	248	Regression[a]	6.9E+00	USEPA (2003a)[a]	1.0E+00	2.5E+02	Assumption[c]	2.0E-04	5.0E-02	Baes et al. (1984)[f]
Arsenic	433	Regression[a]	4.1E+00	Efroymson et al (2001)[a]	Regression[d]	1.7E+01	Sample et al. (1999a)[d]	Regression[g]	1.1E+00	Sample et al. (1998b)[g]
Barium	390	1.50E-01	5.9E+01	Baes et al. (1984)	9.1E-02	3.5E+01	Sample et al (1998)[b]	5.7E-02	2.2E+01	Sample et al. (1998b)[h]
Cadmium	3660	Regression[a]	5.6E+01	Efroymson et al. (2001)[a]	Regression[d]	3.6E+03	Neuhauser et al. (1995)	Regression[g]	2.2E+01	Sample et al. (1998b)[g]
Chromium	42.3	7.50E-03	3.2E-01	Baes et al. (1984)	3.1E-01	1.3E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Cobalt	50 8	2.00E-02	1.0E+00	Baes et al. (1984)	1.2E-01	6.2E+00	Sample et al. (1998)[b]	2.1E-02	1.0E+00	Sample et al. (1998b)[h]
Copper	4470	Regression[a]	5.2E+01	Efroymson et al. (2001)[a]	Regression[d]	4.91E+01	Sample et al. (1999a)[d]	Regression[g]	3.7E+01	Sample et al. (1998b)[g]
Lead	124000	Regression[a]	1.9E+02	Efroymson et al. (2001)[a]	Regression[d]	1.1E+04	Sample et al. (1999a)[d]	Regression[g]	2.4E+02	Sample et al. (1998b)[g]
Manganese	5690	2.50E-01	1.4E+03	Baes et al. (1984)	Regression[d]	1.6E+02	Sample et al. (1999a)[d]	1.0E-04	5.7E-01	Baes et al. (1984)[f]
Mercury	147	Regression[a]	5.4E+00	Efroymson et al. (2001)[a]	Regression[d]	5.6E+00	Sample et al. (1999a)[d]	5.4E-02	8.0E+00	Sample et al. (1998b)[h]
Nickel	26.7	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	1.1E+00	2.8E+01	Sample et al. (1998a)[e]	Regression[g]	3.6E+00	Sample et al. (1998b)[g]
Selenium	86 3	Regression[a]	6.8E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+01	Sample et al. (1999a)[d]	Regression[g]	3.5E+00	Sample et al. (1998b)[g]
Silver	405	4.00E-01	1.6E+02	Baes et al. (1984)	2.0E+00	8.3E+02	Sample et al. (1998)[b]	1.2E-03	4.9E-01	Baes et al (1984)[f]
Thallium	3.09	4.00E-03	1.2E-02	Baes et al. (1984)	1.0E+00	3.1E+00	Assumption[c]	1.1E-01	3.5E-01	Sample et al. (1998b)[h]
Vanadium	29.8	5.50E-03	1.6E-01	Baes et al. (1984)	4.2E-02	1.3E+00	Sample et al. (1998a)[b]	1.4E-05	4.1E-04	Baes et al. (1984)[f]
Zinc	105000	Regression[a]	3.1E+03	Efroymson et al. (2001)[a]	Regression[d]	3.8E+03	Sample et al. (1999a)[d]	Regression[g]	2 1E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0 56	Efroymson et al. (2001)
Cadmium	-0.48	0 55	Efroymson et al (2001)
Copper	0.67	0 39	Efroymson et al (2001)
Lead	-1.33	0 56	Efroymson et al (2001)
Mercury	-1	0 54	Efroymson et al (2001)
Nickel	-2 22	0.75	Efroymson et al (2001)
Selenium	-0 68	1 1	Efroymson et al (2001)
Zinc	1 58	0 56	Efroymson et al (2001)

b, Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.
c, Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed.
d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0 7	Sample et al. (1999)
Cadmium	1.21	0 66	Neuhauser et al (1995)
Copper	1 67	0.26	Sample et al (1999)
Lead	-0.21	0 81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al (1999)
Manganese	-0 8	0 68	Sample et al. (1999)
Selenium	-0 075	0 73	Sample et al (1999)
Zinc	4.44	0 33	Sample et al (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.
f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)
g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1
Arsenic	-4 8471	0 8188
Cadmium	-1 5383	0 566
Chromium	-1.4599	0 7338
Copper	2.1042	0.1783
Iron	-0 2879	0 5969
Lead	-0 6114	0 5181
Nickel	-0 2462	0.4658
Selenium	-0 4158	0.3764
Zinc	4 4713	0 0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.
i, EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.
j, CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items.

TABLE F-19
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS FOR BURROWING RECEPTORS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA 25-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations In Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	41 7	Regression[a]	1.3E+00	USEPA (2003a)[a]	1 0E+00	4 2E+01	Assumption[c]	2 0E-04	8.3E-03	Baes et al. (1984)[f]
Arsenic	60.2	Regression[a]	1.4E+00	Efroymson et al (2001)[a]	Regression[d]	4.3E+00	Sample et al. (1999a)[d]	Regression[g]	2.2E-01	Sample et al. (1998b)[g]
Barium	116.57	1.50E-01	1.7E+01	Baes et al (1984)	9 1E-02	1.1E+01	Sample et al. (1998)[b]	5.7E-02	6.6E+00	Sample et al. (1998b)[h]
Cadmium	450	Regression[a]	1 8E+01	Efroymson et al. (2001)[a]	Regression[d]	9.1E+02	Neuhauser et al (1995)	Regression[g]	6 8E+00	Sample et al. (1998b)[g]
Chromium	15 18	7.50E-03	1.1E-01	Baes et al (1984)	3.1E-01	4.6E+00	Sample et al. (1998a)[e]	Regression[g]	1.7E+00	Sample et al. (1998b)[g]
Cobalt	7.66	2 00E-02	1.5E-01	Baes et al. (1984)	1.2E-01	9.3E-01	Sample et al (1998)[b]	2.1E-02	1 6E-01	Sample et al (1998b)[h]
Copper	646	Regression[a]	2.4E+01	Efroymson et al (2001)[a]	Regression[d]	2.95E+01	Sample et al. (1999a)[d]	Regression[g]	2 6E+01	Sample et al (1998b)[g]
Lead	13783	Regression[a]	5 5E+01	Efroymson et al. (2001)[a]	Regression[d]	1.8E+03	Sample et al. (1999a)[d]	Regression[g]	7.6E+01	Sample et al. (1998b)[g]
Manganese	683.87	2.50E-01	1.7E+02	Baes et al (1984)	Regression[d]	3.8E+01	Sample et al. (1999a)[d]	1 0E-04	6.8E-02	Baes et al. (1984)[f]
Mercury	16.37	Regression[a]	1 7E+00	Efroymson et al. (2001)[a]	Regression[d]	2.7E+00	Sample et al. (1999a)[d]	5 4E-02	8.9E-01	Sample et al. (1998b)[h]
Nickel	9.17	Regression[a]	5.7E-01	Efroymson et al. (2001)[a]	1.1E+00	9.7E+00	Sample et al (1998a)[e]	Regression[g]	2.2E+00	Sample et al. (1998b)[g]
Selenium	13 37	Regression[a]	8 8E+00	Efroymson et al. (2001)[a]	Regression[d]	6 2E+00	Sample et al. (1999a)[d]	Regression[g]	1.8E+00	Sample et al. (1998b)[g]
Silver	44.5	4.00E-01	1.8E+01	Baes et al. (1984)	2.0E+00	9.1E+01	Sample et al. (1998)[b]	1.2E-03	5.3E-02	Baes et al. (1984)[f]
Thallium	0.59	4 00E-03	2 4E-03	Baes et al. (1984)	1.0E+00	5.9E-01	Assumption[c]	1 1E-01	6.6E-02	Sample et al. (1998b)[h]
Vanadium	12.28	5 50E-03	6 8E-02	Baes et al. (1984)	4.2E-02	5 2E-01	Sample et al. (1998a)[b]	1.4E-05	1.7E-04	Baes et al. (1984)[f]
Zinc	14129	Regression[a]	1.0E+03	Efroymson et al. (2001)[a]	Regression[d]	2 0E+03	Sample et al. (1999a)[d]	Regression[g]	1.8E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]) Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3 233	0 937	USEPA 2003a
Arsenic	-1.99	0 56	Efroymson et al. (2001)
Cadmium	-0 48	0.55	Efroymson et al. (2001)
Copper	0 67	0.39	Efroymson et al. (2001)
Lead	-1.33	0 56	Efroymson et al (2001)
Mercury	-1	0 54	Efroymson et al (2001)
Nickel	-2.22	0 75	Efroymson et al (2001)
Selenium	-0 68	1 1	Efroymson et al. (2001)
Zinc	1 58	0 56	Efroymson et al (2001)

b, Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c, Soil-invertebrate bioaccumulation factor could not be identified, therefore, a default accumulation factor of 1.0 was assummed.

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil])
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1 42	0 7	Sample et al. (1999)
Cadmium	1 21	0 66	Neuhauser et al (1995)
Copper	1 67	0 26	Sample et al. (1999)
Lead	-0 21	0.81	Sample et al. (1999)
Mercury	-0 078	0 33	Sample et al. (1999)
Manganese	-0 8	0 68	Sample et al (1999)
Selenium	-0 075	0 73	Sample et al (1999)
Zinc	4 44	0 33	Sample et al. (1999)

e, 90th percentile of UFs reported in Sample et al (1998a) were used as a bioaccumulation factor

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]) Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4 8471	0 8188
Cadmium	-1 5383	0.566
Chromium	-1 4599	0 7338
Copper	2 1042	0 1783
Iron	-0 2879	0.5969
Lead	-0 6114	0 5181
Nickel	-0 2462	0.4658
Selenium	-0 4158	0 3764
Zinc	4 4713	0 0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i, EPC dataset does not include results from samples SL-447 or SL-448: these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

TABLE F-20
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[1] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	273	Regression[a]	7.6E+00	USEPA (2003a)[a]	1.0E+00	2.7E+02	Assumption[c]	2.0E-04	5.5E-02	Baes et al. (1984)[f]
Arsenic	163	Regression[a]	2.4E+00	Efroymson et al. (2001)[a]	Regression[d]	8.5E+00	Sample et al. (1999a)[d]	Regression[g]	5.1E-01	Sample et al. (1998b)[g]
Barium	166	1.50E-01	2.5E+01	Baes et al. (1984)	9.1E-02	1.5E+01	Sample et al. (1998)[b]	5.7E-02	9.4E+00	Sample et al. (1998b)[h]
Cadmium	322	Regression[a]	1.5E+01	Efroymson et al. (2001)[a]	Regression[d]	7.3E+02	Neuhauser et al. (1995)	Regression[g]	5.6E+00	Sample et al. (1998b)[g]
Chromium	29.2	7.50E-03	2.2E-01	Baes et al. (1984)	3.1E-01	8.9E+00	Sample et al. (1998a)[e]	Regression[g]	2.8E+00	Sample et al. (1998b)[g]
Cobalt	3.98	2.00E-02	8.0E-02	Baes et al. (1984)	1.2E-01	4.9E-01	Sample et al. (1998)[b]	2.1E-02	8.2E-02	Sample et al. (1998b)[h]
Copper	469	Regression[a]	2.2E+01	Efroymson et al. (2001)[a]	Regression[d]	2.71E+01	Sample et al. (1999a)[d]	Regression[g]	2.5E+01	Sample et al. (1998b)[g]
Lead	5720	Regression[a]	3.4E+01	Efroymson et al. (2001)[a]	Regression[d]	9.0E+02	Sample et al. (1999a)[d]	Regression[g]	4.8E+01	Sample et al. (1998b)[g]
Manganese	428	2.50E-01	1.1E+02	Baes et al. (1984)	Regression[d]	2.8E+01	Sample et al. (1999a)[d]	1.0E-04	4.3E-02	Baes et al. (1984)[f]
Mercury	20.8	Regression[a]	1.9E+00	Efroymson et al. (2001)[a]	Regression[d]	2.9E+00	Sample et al. (1999a)[d]	5.4E-02	1.1E+00	Sample et al. (1998b)[h]
Nickel	9.48	Regression[a]	5.9E-01	Efroymson et al. (2001)[a]	1.1E+00	1.0E+01	Sample et al. (1998a)[e]	Regression[g]	2.2E+00	Sample et al. (1998b)[g]
Selenium	9.55	Regression[a]	6.1E+00	Efroymson et al. (2001)[a]	Regression[d]	4.8E+00	Sample et al. (1999a)[d]	Regression[g]	1.5E+00	Sample et al. (1998b)[g]
Silver	21.3	4.00E-01	8.5E+00	Baes et al. (1984)	2.0E+00	4.4E+01	Sample et al. (1998)[b]	1.2E-03	2.6E-02	Baes et al. (1984)[f]
Thallium	0.343	4.00E-03	1.4E-03	Baes et al. (1984)	1.0E+00	3.4E-01	Assumption[c]	1.1E-01	3.9E-02	Sample et al. (1998b)[h]
Vanadium	8.62	5.50E-03	4.7E-02	Baes et al. (1984)	4.2E-02	3.6E-01	Sample et al. (1998a)[b]	1.4E-05	1.2E-04	Baes et al. (1984)[f]
Zinc	10000	Regression[a]	8.4E+02	Efroymson et al. (2001)[a]	Regression[d]	1.8E+03	Sample et al. (1999a)[d]	Regression[g]	1.7E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b, Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c, Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).

Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows.

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i, EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j, CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items.

TABLE F-21
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	48.4	Regression[a]	1.5E+00	USEPA (2003a)[a]	1.0E+00	4.8E+01	Assumption[c]	2.0E-04	9.7E-03	Baes et al. (1984)[f]
Arsenic	34.0	Regression[a]	9.9E-01	Efroymson et al. (2001)[a]	Regression[d]	2.9E+00	Sample et al. (1999a)[d]	Regression[g]	1.4E-01	Sample et al. (1998b)[g]
Barium	41.04	1.50E-01	6.2E+00	Baes et al. (1984)	9.1E-02	3.7E+00	Sample et al. (1998)[b]	5.7E-02	2.3E+00	Sample et al. (1998b)[h]
Cadmium	59	Regression[a]	5.8E+00	Efroymson et al. (2001)[a]	Regression[d]	2.4E+02	Neuhauser et al. (1995)	Regression[g]	2.2E+00	Sample et al. (1998b)[g]
Chromium	9.89	7.50E-03	7.4E-02	Baes et al. (1984)	3.1E-01	3.0E+00	Sample et al. (1998a)[e]	Regression[g]	1.2E+00	Sample et al. (1998b)[g]
Cobalt	1.66	2.00E-02	3.3E-02	Baes et al. (1984)	1.2E-01	2.0E-01	Sample et al. (1998)[b]	2.1E-02	3.4E-02	Sample et al. (1998b)[h]
Copper	93	Regression[a]	1.1E+01	Efroymson et al. (2001)[a]	Regression[d]	1.77E+01	Sample et al. (1999a)[d]	Regression[g]	1.8E+01	Sample et al. (1998b)[g]
Lead	1152	Regression[a]	1.4E+01	Efroymson et al. (2001)[a]	Regression[d]	2.4E+02	Sample et al. (1999a)[d]	Regression[g]	2.1E+01	Sample et al. (1998b)[g]
Manganese	94.58	2.50E-01	2.4E+01	Baes et al. (1984)	Regression[d]	9.9E+00	Sample et al. (1999a)[d]	1.0E-04	9.5E-03	Baes et al. (1984)[f]
Mercury	3.94	Regression[a]	7.7E-01	Efroymson et al. (2001)[a]	Regression[d]	1.7E+00	Sample et al. (1999a)[d]	5.4E-02	2.1E-01	Sample et al. (1998b)[h]
Nickel	3.89	Regression[a]	3.0E-01	Efroymson et al. (2001)[a]	1.1E+00	4.1E+00	Sample et al. (1998a)[e]	Regression[g]	1.5E+00	Sample et al. (1998b)[g]
Selenium	2.38	Regression[a]	1.3E+00	Efroymson et al. (2001)[a]	Regression[d]	1.7E+00	Sample et al. (1999a)[d]	Regression[g]	9.2E-01	Sample et al. (1998b)[g]
Silver	4.2	4.00E-01	1.7E+00	Baes et al. (1984)	2.0E+00	8.7E+00	Sample et al. (1998)[b]	1.2E-03	5.1E-03	Baes et al. (1984)[f]
Thallium	0.14	4.00E-03	5.6E-04	Baes et al. (1984)	1.0E+00	1.4E-01	Assumption[c]	1.1E-01	1.6E-02	Sample et al. (1998b)[h]
Vanadium	4.98	5.50E-03	2.7E-02	Baes et al. (1984)	4.2E-02	2.1E-01	Sample et al. (1998a)[b]	1.4E-05	6.8E-05	Baes et al. (1984)[f]
Zinc	2860	Regression[a]	4.2E+02	Efroymson et al. (2001)[a]	Regression[d]	1.2E+03	Sample et al. (1999a)[d]	Regression[g]	1.6E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
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Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

TABLE F-22
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS FOR BURROWING RECEPTORS - MAXIMUM MEDIA CONCENTRATIONS
NATURAL AREA 50-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Maximum Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	400	Regression[a]	1.1E+01	USEPA (2003a)[a]	1.0E+00	4.0E+02	Assumption[c]	2.0E-04	8.0E-02	Baes et al. (1984)[f]
Arsenic	163	Regression[a]	2.4E+00	Efroymson et al. (2001)[a]	Regression[d]	8.5E+00	Sample et al. (1999a)[d]	Regression[g]	5.1E-01	Sample et al. (1998b)[g]
Barium	166	1.50E-01	2.5E+01	Baes et al. (1984)	9.1E-02	1.5E+01	Sample et al. (1998)[b]	5.7E-02	9.4E+00	Sample et al. (1998b)[h]
Cadmium	322	Regression[a]	1.5E+01	Efroymson et al. (2001)[a]	Regression[d]	7.3E+02	Neuhauser et al. (1995)	Regression[g]	5.6E+00	Sample et al. (1998b)[g]
Chromium	29.2	7.50E-03	2.2E-01	Baes et al. (1984)	3.1E-01	8.9E+00	Sample et al. (1998a)[e]	Regression[g]	2.8E+00	Sample et al. (1998b)[g]
Cobalt	5.26	2.00E-02	1.1E-01	Baes et al. (1984)	1.2E-01	6.4E-01	Sample et al. (1998)[b]	2.1E-02	1.1E-01	Sample et al. (1998b)[h]
Copper	469	Regression[a]	2.2E+01	Efroymson et al. (2001)[a]	Regression[d]	2.71E+01	Sample et al. (1999a)[d]	Regression[g]	2.5E+01	Sample et al. (1998b)[g]
Lead	5720	Regression[a]	3.4E+01	Efroymson et al. (2001)[a]	Regression[d]	9.0E+02	Sample et al. (1999a)[d]	Regression[g]	4.8E+01	Sample et al. (1998b)[g]
Manganese	428	2.50E-01	1.1E+02	Baes et al. (1984)	Regression[d]	2.8E+01	Sample et al. (1999a)[d]	1.0E-04	4.3E-02	Baes et al. (1984)[f]
Mercury	48.7	Regression[a]	3.0E+00	Efroymson et al. (2001)[a]	Regression[d]	3.9E+00	Sample et al. (1999a)[d]	5.4E-02	2.6E+00	Sample et al. (1998b)[h]
Nickel	12.5	Regression[a]	7.2E-01	Efroymson et al. (2001)[a]	1.1E+00	1.3E+01	Sample et al. (1998a)[e]	Regression[g]	2.5E+00	Sample et al. (1998b)[g]
Selenium	34.1	Regression[a]	2.5E+01	Efroymson et al. (2001)[a]	Regression[d]	1.2E+01	Sample et al. (1999a)[d]	Regression[g]	2.5E+00	Sample et al. (1998b)[g]
Silver	21.3	4.00E-01	8.5E+00	Baes et al. (1984)	2.0E+00	4.4E+01	Sample et al. (1998)[b]	1.2E-03	2.6E-02	Baes et al. (1984)[f]
Thallium	0.402	4.00E-03	1.6E-03	Baes et al. (1984)	1.0E+00	4.0E-01	Assumption[c]	1.1E-01	4.5E-02	Sample et al. (1998b)[h]
Vanadium	8.62	5.50E-03	4.7E-02	Baes et al. (1984)	4.2E-02	3.6E-01	Sample et al. (1998a)[b]	1.4E-05	1.2E-04	Baes et al. (1984)[f]
Zinc	14800	Regression[a]	1.1E+03	Efroymson et al. (2001)[a]	Regression[d]	2.0E+03	Sample et al. (1999a)[d]	Regression[g]	1.8E+02	Sample et al. (1998b)[g]

Notes:

a, Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b, Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor

c, Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d, Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]).
Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e, 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f, Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g, Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h, Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor

i, EPC dataset does not include results from samples SL-447 or SL-448; these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

j, CN is metabolized rapidly at low doses and is not expected to bioaccumulate. A conservative uptake factor of 1 is used to estimate CN concentrations in food items.

TABLE F-23
ESTIMATED TERRESTRIAL PREY CONCENTRATIONS FOR BURROWING RECEPTORS - MEAN MEDIA CONCENTRATIONS
NATURAL AREA 50-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Mean Soil Exposure Point Concentration[i] (mg/kg, dry weight)	Estimated Concentrations in Dietary Items of Terrestrial Receptors (mg/kg, dry weight)								
		Plants			Soil Invertebrates			Small Mammals		
		Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference	Bioaccumulation Factor (BAF)	Estimated Concentration	BAF Reference
Antimony	60.0	Regression[a]	1.8E+00	USEPA (2003a)[e]	1.0E+00	6.0E+01	Assumption[c]	2.0E-04	1.2E-02	Baes et al. (1984)[f]
Arsenic	24.0	Regression[a]	8.1E-01	Efroymson et al. (2001)[e]	Regression[d]	2.2E+00	Sample et al. (1999a)[d]	Regression[g]	1.1E-01	Sample et al. (1998b)[g]
Barium	32.90	1.50E-01	4.9E+00	Baes et al. (1984)	9.1E-02	3.0E+00	Sample et al. (1998)[b]	5.7E-02	1.9E+00	Sample et al. (1998b)[h]
Cadmium	45	Regression[a]	5.0E+00	Efroymson et al. (2001)[e]	Regression[d]	2.0E+02	Neuhauser et al. (1995)	Regression[g]	1.9E+00	Sample et al. (1998b)[g]
Chromium	10.84	7.50E-03	8.1E-02	Baes et al. (1984)	3.1E-01	3.3E+00	Sample et al. (1998a)[e]	Regression[g]	1.3E+00	Sample et al. (1998b)[g]
Cobalt	2.06	2.00E-02	4.1E-02	Baes et al. (1984)	1.2E-01	2.5E-01	Sample et al. (1998)[b]	2.1E-02	4.2E-02	Sample et al. (1998b)[h]
Copper	88	Regression[a]	1.1E+01	Efroymson et al. (2001)[e]	Regression[d]	1.74E+01	Sample et al. (1999a)[d]	Regression[g]	1.8E+01	Sample et al. (1998b)[g]
Lead	796	Regression[a]	1.1E+01	Efroymson et al. (2001)[e]	Regression[d]	1.8E+02	Sample et al. (1999a)[d]	Regression[g]	1.7E+01	Sample et al. (1998b)[g]
Manganese	67.26	2.50E-01	1.7E+01	Baes et al. (1984)	Regression[d]	7.9E+00	Sample et al. (1999a)[d]	1.0E-04	6.7E-03	Baes et al. (1984)[f]
Mercury	7.49	Regression[a]	1.1E+00	Efroymson et al. (2001)[e]	Regression[d]	2.1E+00	Sample et al. (1999a)[d]	5.4E-02	4.1E-01	Sample et al. (1998b)[h]
Nickel	4.55	Regression[a]	3.4E-01	Efroymson et al. (2001)[e]	1.1E+00	4.8E+00	Sample et al. (1998a)[e]	Regression[g]	1.6E+00	Sample et al. (1998b)[g]
Selenium	5.12	Regression[a]	3.1E+00	Efroymson et al. (2001)[e]	Regression[d]	3.1E+00	Sample et al. (1999a)[d]	Regression[g]	1.2E+00	Sample et al. (1998b)[g]
Silver	3.4	4.00E-01	1.4E+00	Baes et al. (1984)	2.0E+00	7.0E+00	Sample et al. (1998)[b]	1.2E-03	4.1E-03	Baes et al. (1984)[f]
Thallium	0.15	4.00E-03	5.9E-04	Baes et al. (1984)	1.0E+00	1.5E-01	Assumption[c]	1.1E-01	1.7E-02	Sample et al. (1998b)[h]
Vanadium	4.98	5.50E-03	2.7E-02	Baes et al. (1984)	4.2E-02	2.1E-01	Sample et al. (1998a)[b]	1.4E-05	6.8E-05	Baes et al. (1984)[f]
Zinc	4038	Regression[a]	5.1E+02	Efroymson et al. (2001)[e]	Regression[d]	1.3E+03	Sample et al. (1999a)[d]	Regression[g]	1.6E+02	Sample et al. (1998b)[g]

Notes:

a. Plant tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Antimony	-3.233	0.937	USEPA 2003a
Arsenic	-1.99	0.56	Efroymson et al. (2001)
Cadmium	-0.48	0.55	Efroymson et al. (2001)
Copper	0.67	0.39	Efroymson et al. (2001)
Lead	-1.33	0.56	Efroymson et al. (2001)
Mercury	-1	0.54	Efroymson et al. (2001)
Nickel	-2.22	0.75	Efroymson et al. (2001)
Selenium	-0.68	1.1	Efroymson et al. (2001)
Zinc	1.58	0.56	Efroymson et al. (2001)

b. Median UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

c. Soil-invertebrate bioaccumulation factor could not be identified; therefore, a default accumulation factor of 1.0 was assummed.

d. Soil invertebrate tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]), except for Cd which follows the form log([tissue]) = B0 + B1(log[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1	Data Source for Model
Arsenic	-1.42	0.7	Sample et al. (1999)
Cadmium	1.21	0.66	Neuhauser et al. (1995)
Copper	1.67	0.26	Sample et al. (1999)
Lead	-0.21	0.81	Sample et al. (1999)
Mercury	-0.078	0.33	Sample et al. (1999)
Manganese	-0.8	0.68	Sample et al. (1999)
Selenium	-0.075	0.73	Sample et al. (1999)
Zinc	4.44	0.33	Sample et al. (1999)

e. 90th percentile of UFs reported in Sample et al. (1998a) were used as a bioaccumulation factor.

f. Bioaccumulation factor estimated as the product of the soil-plant and ingestion-beef factors reported in Baes et al. (1984)

g. Small mammal tissue concentrations (mg/kg dry weight) calculated based on regression models, where ln([tissue]) = B0 + B1(ln[soil]). Slopes (B1) and intercepts (B0) are as follows:

Metal	B0	B1
Arsenic	-4.8471	0.8188
Cadmium	-1.5383	0.566
Chromium	-1.4599	0.7338
Copper	2.1042	0.1783
Iron	-0.2879	0.5969
Lead	-0.6114	0.5181
Nickel	-0.2462	0.4658
Selenium	-0.4158	0.3764
Zinc	4.4713	0.0738

h. Median of general UFs reported in Sample et al. (1998b) was used as a bioaccumulation factor.

i. EPC dataset does not include results from samples SL-447 or SL-448, these samples were collected within a delineated lead hotspot and are not representative of exposure throughout the entire exposure unit.

TABLE F-24
DIRECT EXPOSURE RISK ESTIMATES FOR PLANTS
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Parameter	Unit	Screening Value	Screening Value Source	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ
AROCLOR 1254	MG/KG	40	a2	0.095	0.095			0.04	1	3	0	ECH-S-S1C-04S(0-2)	<1
AROCLOR 1260	MG/KG	40	a2	0.165	0.165			0.06	1	3	0	ECH-S-S1C-04S(0-2)	<1
DDT	MG/KG	NA	--	0.00102	0.00957			0.01	5	5	--	ECH-E-S1J-03S(0-2)-DUP	
METHOXYCHLOR	MG/KG	NA	--	0.272	1.87			0.55	3	4	--	ECH-E-S1J-03S(0-2)-DUP	
ANTIMONY	MG/KG	5	a	3	884			105.1	35	44	31	ECH-S-RFI2-A13-2(0-2)	177
ARSENIC	MG/KG	18	b	2.6	62000			2052.1	39	43	34	ECH-S-RFI2-S1J-4-(0-2)	3444
BARIUM	MG/KG	500	a	30	7720			974.6	44	44	21	ECH-S-RFI2-S1I-1(0-1.25)	15.4
BORON	MG/KG	0.5	a	5.5	118			27.5	11	16	11	ECH-S-A13-02S(0-2)	236.0
CADMIUM	MG/KG	32	b	0.96	1020			125.3	42	44	25	ECH-S-RFI2-S1I-2(0-1.5)	31.9
CHROMIUM	MG/KG	1	a	1.85	234			29.1	44	44	44	ECH-S-RFI2-S1I-4(0-1)	234
COPPER	MG/KG	100	a	1.89	4470			518.1	44	44	32	ECH-S-RFI2-A13-2(0-2)	44.7
CYANIDE	MG/KG	NA	--	0.97	0.97			0.47	1	5	--	ECH-S-S1C-03S(0-2)	
LEAD	MG/KG	120	b	13.4	58300			9443.1	44	44	36	ECH-S-RFI2-S1J-1(0-2)	486
NICKEL	MG/KG	30	a	1.1	569			61.1	41	44	22	ECH-S-RFI2-S1B-4(0-1.5)	19.0
SELENIUM	MG/KG	1	a	1.47	902			124.8	31	44	30	ECH-S-RFI2-S1A-6(0-1)	902
VANADIUM	MG/KG	2	a	0.48	412			55.2	44	44	41	ECH-S-RFI2-S1B-3(0-1)	206
ZINC	MG/KG	50	a	7.88	120000			22555.1	43	44	40	ECH-E-S1J-01S(0-2)	2400

Note: Aroclor screening value reflects Region V ESL for total PCBs.
Other Screening values include Region IV values
NU - denotes that values available for these analytes were not used based on the heirarchy set forth in the WP
a - Efroymson et al. 1997
1 - value for fluorine
2 - value for total PCBs
b - Eco-SSLs
c - Region 5 ESLs
NA - Not available

TABLE F-25
DIRECT EXPOSURE RISK ESTIMATES FOR SOIL INVERTEBRATES
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Parameter	Unit	Screening Value	Screening Value Source	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ
AROCLOR 1254	MG/KG	NA	--	0.095	0.095			0.04	1	3	--	ECH-S-S1C-04S(0-2)	
AROCLOR 1260	MG/KG	NA	--	0.165	0.165			0.06	1	3	--	ECH-S-S1C-04S(0-2)	
DDT	MG/KG	NA	--	0.00102	0.00957			0.01	2	5	--	ECH-E-S1J-02S(0-2)	
METHOXYCHLOR	MG/KG	NA	--	0.272	1.87			0.55	2	4	--	ECH-E-S1J-03S(0-2)-DUP	
ANTIMONY	MG/KG	78	b	3	884			105.1	35	44	3	ECH-S-RFI2-A13-2(0-2)	11
ARSENIC	MG/KG	60	a	2.6	62000			2052.1	40	44	26	ECH-S-RFI2-S1J-4-(0-2)	1033
BARIUM	MG/KG	330	b	30	7720			974.6	44	44	23	ECH-S-RFI2-S1I-1(0-1.25)	23
BORON	MG/KG	NA	--	5.5	118			27.5	11	16	--	ECH-S-A13-02S(0-2)	
CADMIUM	MG/KG	140	b	0.96	1020			125.3	42	44	10	ECH-S-RFI2-S1I-2(0-1.5)	7.3
CHROMIUM	MG/KG	0.4	a	1.85	234			29.1	44	44	44	ECH-S-RFI2-S1I-4(0-1)	585
COPPER	MG/KG	60	a	1.89	4470			518.1	44	44	32	ECH-S-RFI2-A13-2(0-2)	75
CYANIDE	MG/KG	NA	--	0.97	0.97			0.47	1	5	--	ECH-S-S1C-03S(0-2)	
LEAD	MG/KG	1700	b	13.4	58300			9443.1	44	44	28	ECH-S-RFI2-S1J-1(0-2)	34
NICKEL	MG/KG	200	a	1.1	569			61.1	41	44	2	ECH-S-RFI2-S1B-4(0-1.5)	2.8
SELENIUM	MG/KG	70	a	1.47	902			124.8	30	44	4	ECH-S-RFI2-S1A-6(0-1)	13
VANADIUM	MG/KG	NA	--	0.48	412			55.2	44	44	--	ECH-S-RFI2-S1B-3(0-1)	
ZINC	MG/KG	100	a	7.88	120000			22555.1	43	44	38	ECH-E-S1J-01S(0-2)	1200

Note: Aroclor screening value reflects Region V ESL for total PCBs.
Other Screening values include Region IV values
NU - denotes that values available for these analytes were not used based on the heirarchy set forth in the WP
NA - Not Available

TABLE F-26
MAXIMUM EXPOSURE ESTIMATE -- CANADA GOOSE
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	7.2E-01	0.0E+00	0.0E+00	7.2E-01	2.3E+00	3.0E+00	NA	--	NA	--
Arsenic	6.2E+04	2.1E+00	0.0E+00	0.0E+00	2.1E+00	1.6E+02	1.6E+02	5.5E+00	**29.7**	2.2E+01	**7.4**
Barium	7.7E+03	3.7E+01	0.0E+00	0.0E+00	3.7E+01	2.0E+01	5.7E+01	2.1E+02	<1	4.2E+02	<1
Boron	1.2E+02	3.7E+00	0.0E+00	0.0E+00	3.7E+00	3.1E-01	4.1E+00	2.9E+01	<1	1.0E+02	<1
Cadmium	1.0E+03	8.9E-01	0.0E+00	0.0E+00	8.9E-01	2.7E+00	3.5E+00	1.9E+00	**1.9**	2.1E+01	<1
Chromium	2.3E+02	5.6E-02	0.0E+00	0.0E+00	5.6E-02	6.1E-01	6.7E-01	3.8E+01	<1	7.5E+01	<1
Copper	4.5E+03	1.6E+00	0.0E+00	0.0E+00	1.6E+00	1.2E+01	1.3E+01	3.3E+01	<1	6.2E+01	<1
Lead	5.8E+04	3.9E+00	0.0E+00	0.0E+00	3.9E+00	1.5E+02	1.6E+02	7.4E+00	**21.0**	3.7E+01	**4.2**
Nickel	5.7E+02	4.0E-01	0.0E+00	0.0E+00	4.0E-01	1.5E+00	1.9E+00	8.0E+01	<1	1.1E+02	<1
Selenium	9.0E+02	2.9E+01	0.0E+00	0.0E+00	2.9E+01	2.3E+00	3.1E+01	4.0E-01	**77.5**	8.0E-01	**38.8**
Vanadium	4.1E+02	7.2E-02	0.0E+00	0.0E+00	7.2E-02	1.1E+00	1.1E+00	1.1E+01	<1	5.7E+01	<1
Zinc	1.2E+05	1.1E+02	0.0E+00	0.0E+00	1.1E+02	3.1E+02	4.2E+02	1.5E+01	**29.0**	1.3E+02	**3.2**
Organics											
Aroclor 1254	9.5E-02	4.9E-04	0.0E+00	0.0E+00	4.9E-04	2.5E-04	7.4E-04	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	1.7E-01	8.5E-04	0.0E+00	0.0E+00	8.5E-04	4.3E-04	1.3E-03	1.8E-01	<1	1.8E+00	<1
DDT	1.5E-02	6.5E-05	0.0E+00	0.0E+00	6.5E-05	3.9E-05	1.0E-04	3.0E+00	<1	1.5E+01	<1
Methoxychlor	1.9E+00	3.1E-02	0.0E+00	0.0E+00	3.1E-02	4.9E-03	3.6E-02	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	9.7E-01	3.1E-02	0.0E+00	0.0E+00	3.1E-02	2.5E-03	3.3E-02	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-27
MEAN EXPOSURE ESTIMATE -- CANADA GOOSE
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	9.8E-02	0.0E+00	0.0E+00	9.8E-02	2.7E-01	3.7E-01	NA	--	NA	--
Arsenic	2.1E+03	3.1E-01	0.0E+00	0.0E+00	3.1E-01	5.5E+00	5.8E+00	5.5E+00	**1.1**	2.2E+01	<1
Barium	9.7E+02	4.6E+00	0.0E+00	0.0E+00	4.6E+00	2.5E+00	7.2E+00	2.1E+02	<1	4.2E+02	<1
Boron	2.6E+01	8.2E-01	0.0E+00	0.0E+00	8.2E-01	6.7E-02	8.9E-01	2.9E+01	<1	1.0E+02	<1
Cadmium	1.3E+02	2.8E-01	0.0E+00	0.0E+00	2.8E-01	3.3E-01	6.1E-01	1.9E+00	<1	2.1E+01	<1
Chromium	2.9E+01	6.9E-03	0.0E+00	0.0E+00	6.9E-03	7.6E-02	8.3E-02	3.8E+01	<1	7.5E+01	<1
Copper	5.2E+02	7.1E-01	0.0E+00	0.0E+00	7.1E-01	1.3E+00	2.1E+00	3.3E+01	<1	6.2E+01	<1
Lead	9.4E+03	1.4E+00	0.0E+00	0.0E+00	1.4E+00	2.5E+01	2.6E+01	7.4E+00	**3.5**	3.7E+01	<1
Nickel	6.1E+01	7.5E-02	0.0E+00	0.0E+00	7.5E-02	1.6E-01	2.3E-01	8.0E+01	<1	1.1E+02	<1
Selenium	1.4E+02	3.7E+00	0.0E+00	0.0E+00	3.7E+00	3.7E-01	4.1E+00	4.0E-01	**10.3**	8.0E-01	**5.1**
Vanadium	5.5E+01	9.6E-03	0.0E+00	0.0E+00	9.6E-03	1.4E-01	1.5E-01	1.1E+01	<1	5.7E+01	<1
Zinc	2.3E+04	4.2E+01	0.0E+00	0.0E+00	4.2E+01	5.9E+01	1.0E+02	1.5E+01	**7.0**	1.3E+02	<1
Organics											
Aroclor 1254	4.0E-02	2.1E-04	0.0E+00	0.0E+00	2.1E-04	1.1E-04	3.1E-04	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	6.4E-02	3.3E-04	0.0E+00	0.0E+00	3.3E-04	1.7E-04	4.9E-04	1.8E-01	<1	1.8E+00	<1
DDT	9.6E-03	4.1E-05	0.0E+00	0.0E+00	4.1E-05	2.5E-05	6.7E-05	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.5E-01	9.2E-03	0.0E+00	0.0E+00	9.2E-03	1.4E-03	1.1E-02	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	4.7E-01	1.5E-02	0.0E+00	0.0E+00	1.5E-02	1.2E-03	1.6E-02	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-28
MAXIMUM EXPOSURE ESTIMATE -- SONG SPARROW
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	1.2E+00	1.5E+02	0.0E+00	1.5E+02	1.7E+01	1.6E+02	NA	--	NA	--
Arsenic	6.2E+04	3.6E+00	9.0E+01	0.0E+00	9.4E+01	1.2E+03	1.3E+03	5.5E+00	**234.4**	2.2E+01	**58.6**
Barium	7.7E+03	6.3E+01	1.2E+02	0.0E+00	1.8E+02	1.5E+02	3.3E+02	2.1E+02	**1.6**	4.2E+02	<1
Boron	1.2E+02	6.5E+00	1.9E+01	0.0E+00	2.6E+01	2.3E+00	2.8E+01	2.9E+01	<1	1.0E+02	<1
Cadmium	1.0E+03	1.5E+00	2.6E+02	0.0E+00	2.6E+02	2.0E+01	2.8E+02	1.9E+00	**146.9**	2.1E+01	**13.2**
Chromium	2.3E+02	9.6E-02	1.2E+01	0.0E+00	1.2E+01	4.5E+00	1.6E+01	3.8E+01	<1	7.5E+01	<1
Copper	4.5E+03	2.8E+00	8.1E+00	0.0E+00	1.1E+01	8.6E+01	9.7E+01	3.3E+01	**2.9**	6.2E+01	**1.6**
Lead	5.8E+04	6.8E+00	9.7E+02	0.0E+00	9.7E+02	1.1E+03	2.1E+03	7.4E+00	**283.4**	3.7E+01	**56.7**
Nickel	5.7E+02	6.9E-01	9.9E+01	0.0E+00	1.0E+02	1.1E+01	1.1E+02	8.0E+01	**1.4**	1.1E+02	**1.0**
Selenium	9.0E+02	4.9E+01	2.2E+01	0.0E+00	7.1E+01	1.7E+01	8.9E+01	4.0E-01	**221.9**	8.0E-01	**110.9**
Vanadium	4.1E+02	1.2E-01	2.8E+00	0.0E+00	3.0E+00	7.9E+00	1.1E+01	1.1E+01	<1	5.7E+01	<1
Zinc	1.2E+05	1.9E+02	6.6E+02	0.0E+00	8.5E+02	2.3E+03	3.2E+03	1.5E+01	**218.0**	1.3E+02	**24.1**
Organics											
Aroclor 1254	9.5E-02	8.4E-04	2.7E-02	0.0E+00	2.8E-02	1.8E-03	3.0E-02	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	1.7E-01	1.5E-03	5.8E-02	0.0E+00	6.0E-02	3.2E-03	6.3E-02	1.8E-01	<1	1.8E+00	<1
DDT	1.5E-02	1.1E-04	3.6E-02	0.0E+00	3.6E-02	2.9E-04	3.6E-02	3.0E+00	<1	1.5E+01	<1
Methoxychlor	1.9E+00	5.4E-02	1.2E+00	0.0E+00	1.2E+00	3.6E-02	1.3E+00	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	9.7E-01	5.3E-02	1.6E-01	0.0E+00	2.1E-01	1.9E-02	2.3E-01	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-29
MEAN EXPOSURE ESTIMATE -- SONG SPARROW
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	1.7E-01	1.7E+01	0.0E+00	1.7E+01	2.0E+00	1.9E+01	NA	--	NA	--
Arsenic	2.1E+03	5.4E-01	8.4E+00	0.0E+00	8.9E+00	4.0E+01	4.9E+01	5.5E+00	**9.0**	2.2E+01	**2.2**
Barium	9.7E+02	8.0E+00	1.5E+01	0.0E+00	2.3E+01	1.9E+01	4.1E+01	2.1E+02	<1	4.2E+02	<1
Boron	2.6E+01	1.4E+00	4.2E+00	0.0E+00	5.6E+00	5.0E-01	6.1E+00	2.9E+01	<1	1.0E+02	<1
Cadmium	1.3E+02	4.8E-01	6.5E+01	0.0E+00	6.5E+01	2.4E+00	6.8E+01	1.9E+00	**35.6**	2.1E+01	**3.2**
Chromium	2.9E+01	1.2E-02	1.5E+00	0.0E+00	1.5E+00	5.6E-01	2.0E+00	3.8E+01	<1	7.5E+01	<1
Copper	5.2E+02	1.2E+00	4.6E+00	0.0E+00	5.8E+00	1.0E+01	1.6E+01	3.3E+01	<1	6.2E+01	<1
Lead	9.4E+03	2.4E+00	2.2E+02	0.0E+00	2.2E+02	1.8E+02	4.1E+02	7.4E+00	**54.8**	3.7E+01	**11.0**
Nickel	6.1E+01	1.3E-01	1.1E+01	0.0E+00	1.1E+01	1.2E+00	1.2E+01	8.0E+01	<1	1.1E+02	<1
Selenium	1.4E+02	6.5E+00	5.7E+00	0.0E+00	1.2E+01	2.7E+00	1.5E+01	4.0E-01	**37.2**	8.0E-01	**18.6**
Vanadium	5.5E+01	1.7E-02	3.8E-01	0.0E+00	4.0E-01	1.1E+00	1.5E+00	1.1E+01	<1	5.7E+01	<1
Zinc	2.3E+04	7.3E+01	3.8E+02	0.0E+00	4.5E+02	4.4E+02	8.9E+02	1.5E+01	**61.3**	1.3E+02	**6.8**
Organics											
Aroclor 1254	4.0E-02	3.6E-04	8.5E-03	0.0E+00	8.9E-03	7.8E-04	9.7E-03	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	6.4E-02	5.6E-04	1.6E-02	0.0E+00	1.6E-02	1.2E-03	1.8E-02	1.8E-01	<1	1.8E+00	<1
DDT	9.6E-03	7.2E-05	2.4E-02	0.0E+00	2.4E-02	1.9E-04	2.5E-02	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.5E-01	1.6E-02	3.5E-01	0.0E+00	3.7E-01	1.1E-02	3.8E-01	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	4.7E-01	2.6E-02	7.7E-02	0.0E+00	1.0E-01	9.0E-03	1.1E-01	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-30
MAXIMUM EXPOSURE ESTIMATE -- AMERICAN ROBIN
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	2.0E+00	5.3E+01	0.0E+00	5.5E+01	5.5E+00	6.1E+01	NA	--	NA	--
Arsenic	6.2E+04	5.9E+00	3.3E+01	0.0E+00	3.9E+01	3.9E+02	4.3E+02	5.5E+00	**77.4**	2.2E+01	**19.3**
Barium	7.7E+03	1.0E+02	4.2E+01	0.0E+00	1.5E+02	4.8E+01	1.9E+02	2.1E+02	<1	4.2E+02	<1
Boron	1.2E+02	1.1E+01	7.1E+00	0.0E+00	1.8E+01	7.4E-01	1.8E+01	2.9E+01	<1	1.0E+02	<1
Cadmium	1.0E+03	2.5E+00	9.4E+01	0.0E+00	9.7E+01	6.4E+00	1.0E+02	1.9E+00	**54.2**	2.1E+01	**4.9**
Chromium	2.3E+02	1.6E-01	4.3E+00	0.0E+00	4.5E+00	1.5E+00	5.9E+00	3.8E+01	<1	7.5E+01	<1
Copper	4.5E+03	4.7E+00	2.9E+00	0.0E+00	7.6E+00	2.8E+01	3.5E+01	3.3E+01	**1.1**	6.2E+01	<1
Lead	5.8E+04	1.1E+01	3.5E+02	0.0E+00	3.6E+02	3.6E+02	7.3E+02	7.4E+00	**98.2**	3.7E+01	**19.6**
Nickel	5.7E+02	1.1E+00	3.6E+01	0.0E+00	3.7E+01	3.5E+00	4.1E+01	8.0E+01	<1	1.1E+02	<1
Selenium	9.0E+02	8.1E+01	8.0E+00	0.0E+00	8.9E+01	5.6E+00	9.5E+01	4.0E-01	**237.0**	8.0E-01	**118.5**
Vanadium	4.1E+02	2.0E-01	1.0E+00	0.0E+00	1.2E+00	2.6E+00	3.8E+00	1.1E+01	<1	5.7E+01	<1
Zinc	1.2E+05	3.1E+02	2.4E+02	0.0E+00	5.5E+02	7.5E+02	1.3E+03	1.5E+01	**89.3**	1.3E+02	**9.9**
Organics											
Aroclor 1254	9.5E-02	1.4E-03	1.0E-02	0.0E+00	1.1E-02	5.9E-04	1.2E-02	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	1.7E-01	2.4E-03	2.1E-02	0.0E+00	2.4E-02	1.0E-03	2.5E-02	1.8E-01	<1	1.8E+00	<1
DDT	1.5E-02	1.8E-04	1.3E-02	0.0E+00	1.3E-02	9.4E-05	1.3E-02	3.0E+00	<1	1.5E+01	<1
Methoxychlor	1.9E+00	8.8E-02	4.3E-01	0.0E+00	5.2E-01	1.2E-02	5.3E-01	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	9.7E-01	8.7E-02	5.8E-02	0.0E+00	1.5E-01	6.0E-03	1.5E-01	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-31
MEAN EXPOSURE ESTIMATE -- AMERICAN ROBIN
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	2.8E-01	6.3E+00	0.0E+00	6.6E+00	6.6E-01	7.2E+00	NA	--	NA	--
Arsenic	2.1E+03	8.9E-01	3.1E+00	0.0E+00	4.0E+00	1.3E+01	1.7E+01	5.5E+00	**3.1**	2.2E+01	<1
Barium	9.7E+02	1.3E+01	5.3E+00	0.0E+00	1.8E+01	6.1E+00	2.5E+01	2.1E+02	<1	4.2E+02	<1
Boron	2.6E+01	2.3E+00	1.5E+00	0.0E+00	3.9E+00	1.6E-01	4.0E+00	2.9E+01	<1	1.0E+02	<1
Cadmium	1.3E+02	7.9E-01	2.4E+01	0.0E+00	2.4E+01	7.8E-01	2.5E+01	1.9E+00	**13.2**	2.1E+01	**1.2**
Chromium	2.9E+01	2.0E-02	5.3E-01	0.0E+00	5.5E-01	1.8E-01	7.4E-01	3.8E+01	<1	7.5E+01	<1
Copper	5.2E+02	2.0E+00	1.7E+00	0.0E+00	3.7E+00	3.2E+00	6.9E+00	3.3E+01	<1	6.2E+01	<1
Lead	9.4E+03	4.0E+00	8.1E+01	0.0E+00	8.5E+01	5.9E+01	1.4E+02	7.4E+00	**19.4**	3.7E+01	**3.9**
Nickel	6.1E+01	2.1E-01	3.9E+00	0.0E+00	4.1E+00	3.8E-01	4.5E+00	8.0E+01	<1	1.1E+02	<1
Selenium	1.4E+02	1.1E+01	2.1E+00	0.0E+00	1.3E+01	8.8E-01	1.4E+01	4.0E-01	**33.9**	8.0E-01	**17.0**
Vanadium	5.5E+01	2.7E-02	1.4E-01	0.0E+00	1.7E-01	3.4E-01	5.1E-01	1.1E+01	<1	5.7E+01	<1
Zinc	2.3E+04	1.2E+02	1.4E+02	0.0E+00	2.6E+02	1.4E+02	4.0E+02	1.5E+01	**27.5**	1.3E+02	**3.0**
Organics											
Aroclor 1254	4.0E-02	5.9E-04	3.1E-03	0.0E+00	3.7E-03	2.5E-04	4.0E-03	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	6.4E-02	9.3E-04	5.8E-03	0.0E+00	6.7E-03	4.0E-04	7.1E-03	1.8E-01	<1	1.8E+00	<1
DDT	9.6E-03	1.2E-04	8.9E-03	0.0E+00	9.0E-03	6.0E-05	9.1E-03	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.5E-01	2.6E-02	1.3E-01	0.0E+00	1.5E-01	3.5E-03	1.6E-01	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	4.7E-01	4.2E-02	2.8E-02	0.0E+00	7.0E-02	2.9E-03	7.3E-02	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-32
MAXIMUM EXPOSURE ESTIMATE -- RED-TAILED HAWK
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	0.0E+00	0.0E+00	1.4E-02	1.4E-02	0.0E+00	1.4E-02	NA	--	NA	--
Arsenic	6.2E+04	0.0E+00	0.0E+00	5.2E+00	5.2E+00	0.0E+00	5.2E+00	5.5E+00	<1	2.2E+01	<1
Barium	7.7E+03	0.0E+00	0.0E+00	3.5E+01	3.5E+01	0.0E+00	3.5E+01	2.1E+02	<1	4.2E+02	<1
Boron	1.2E+02	0.0E+00	0.0E+00	9.4E+00	9.4E+00	0.0E+00	9.4E+00	2.9E+01	<1	1.0E+02	<1
Cadmium	1.0E+03	0.0E+00	0.0E+00	8.6E-01	8.6E-01	0.0E+00	8.6E-01	1.9E+00	<1	2.1E+01	<1
Chromium	2.3E+02	0.0E+00	0.0E+00	1.0E+00	1.0E+00	0.0E+00	1.0E+00	3.8E+01	<1	7.5E+01	<1
Copper	4.5E+03	0.0E+00	0.0E+00	2.9E+00	2.9E+00	0.0E+00	2.9E+00	3.3E+01	<1	6.2E+01	<1
Lead	5.8E+04	0.0E+00	0.0E+00	1.3E+01	1.3E+01	0.0E+00	1.3E+01	7.4E+00	1.7	3.7E+01	<1
Nickel	5.7E+02	0.0E+00	0.0E+00	1.2E+00	1.2E+00	0.0E+00	1.2E+00	8.0E+01	<1	1.1E+02	<1
Selenium	9.0E+02	0.0E+00	0.0E+00	6.8E-01	6.8E-01	0.0E+00	6.8E-01	4.0E-01	1.7	8.0E-01	<1
Vanadium	4.1E+02	0.0E+00	0.0E+00	4.5E-04	4.5E-04	0.0E+00	4.5E-04	1.1E+01	<1	5.7E+01	<1
Zinc	1.2E+05	0.0E+00	0.0E+00	1.6E+01	1.6E+01	0.0E+00	1.6E+01	1.5E+01	1.1	1.3E+02	<1
Organics											
Aroclor 1254	9.5E-02	0.0E+00	0.0E+00	1.3E-02	1.3E-02	0.0E+00	1.3E-02	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	1.7E-01	0.0E+00	0.0E+00	2.5E-02	2.5E-02	0.0E+00	2.5E-02	1.8E-01	<1	1.8E+00	<1
DDT	1.5E-02	0.0E+00	0.0E+00	8.6E-02	8.6E-02	0.0E+00	8.6E-02	3.0E+00	<1	1.5E+01	<1
Methoxychlor	1.9E+00	0.0E+00	0.0E+00	2.1E-02	2.1E-02	0.0E+00	2.1E-02	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	9.7E-01	0.0E+00	0.0E+00	7.7E-02	7.7E-02	0.0E+00	7.7E-02	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-33
MEAN EXPOSURE ESTIMATE -- RED-TAILED HAWK
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	0.0E+00	0.0E+00	1.7E-03	1.7E-03	0.0E+00	1.7E-03	NA	--	NA	--
Arsenic	2.1E+03	0.0E+00	0.0E+00	3.3E-01	3.3E-01	0.0E+00	3.3E-01	5.5E+00	<1	2.2E+01	<1
Barium	9.7E+02	0.0E+00	0.0E+00	4.4E+00	4.4E+00	0.0E+00	4.4E+00	2.1E+02	<1	4.2E+02	<1
Boron	2.6E+01	0.0E+00	0.0E+00	2.0E+00	2.0E+00	0.0E+00	2.0E+00	2.9E+01	<1	1.0E+02	<1
Cadmium	1.3E+02	0.0E+00	0.0E+00	2.6E-01	2.6E-01	0.0E+00	2.6E-01	1.9E+00	<1	2.1E+01	<1
Chromium	2.9E+01	0.0E+00	0.0E+00	2.2E-01	2.2E-01	0.0E+00	2.2E-01	3.8E+01	<1	7.5E+01	<1
Copper	5.2E+02	0.0E+00	0.0E+00	2.0E+00	2.0E+00	0.0E+00	2.0E+00	3.3E+01	<1	6.2E+01	<1
Lead	9.4E+03	0.0E+00	0.0E+00	4.9E+00	4.9E+00	0.0E+00	4.9E+00	7.4E+00	<1	3.7E+01	<1
Nickel	6.1E+01	0.0E+00	0.0E+00	4.2E-01	4.2E-01	0.0E+00	4.2E-01	8.0E+01	<1	1.1E+02	<1
Selenium	1.4E+02	0.0E+00	0.0E+00	3.4E-01	3.4E-01	0.0E+00	3.4E-01	4.0E-01	<1	8.0E-01	<1
Vanadium	5.5E+01	0.0E+00	0.0E+00	6.0E-05	6.0E-05	0.0E+00	6.0E-05	1.1E+01	<1	5.7E+01	<1
Zinc	2.3E+04	0.0E+00	0.0E+00	1.5E+01	1.5E+01	0.0E+00	1.5E+01	1.5E+01	**1.0**	1.3E+02	<1
Organics											
Aroclor 1254	4.0E-02	0.0E+00	0.0E+00	5.3E-03	5.3E-03	0.0E+00	5.3E-03	1.8E-01	<1	1.8E+00	<1
Aroclor 1260	6.4E-02	0.0E+00	0.0E+00	8.7E-03	8.7E-03	0.0E+00	8.7E-03	1.8E-01	<1	1.8E+00	<1
DDT	9.6E-03	0.0E+00	0.0E+00	6.5E-02	6.5E-02	0.0E+00	6.5E-02	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.5E-01	0.0E+00	0.0E+00	6.2E-03	6.2E-03	0.0E+00	6.2E-03	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	4.7E-01	0.0E+00	0.0E+00	3.7E-02	3.7E-02	0.0E+00	3.7E-02	5.2E-01	<1	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-34
MAXIMUM EXPOSURE ESTIMATE -- GROUNDHOG
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	1.2E+00	0.0E+00	0.0E+00	1.2E+00	9.0E-01	2.1E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	6.2E+04	3.4E+00	0.0E+00	0.0E+00	3.4E+00	6.3E+01	6.6E+01	5.7E+00	**11.6**	1.2E+01	**5.7**
Barium	7.7E+03	5.9E+01	0.0E+00	0.0E+00	5.9E+01	7.8E+00	6.7E+01	5.2E+01	**1.3**	2.6E+02	<1
Boron	1.2E+02	6.0E+00	0.0E+00	0.0E+00	6.0E+00	1.2E-01	6.1E+00	2.8E+01	<1	9.4E+01	<1
Cadmium	1.0E+03	1.4E+00	0.0E+00	0.0E+00	1.4E+00	1.0E+00	2.5E+00	5.1E+00	<1	7.1E+00	<1
Chromium	2.3E+02	8.9E-02	0.0E+00	0.0E+00	8.9E-02	2.4E-01	3.3E-01	7.4E+00	<1	3.7E+01	<1
Copper	4.5E+03	2.6E+00	0.0E+00	0.0E+00	2.6E+00	4.5E+00	7.2E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.8E+04	6.3E+00	0.0E+00	0.0E+00	6.3E+00	5.9E+01	6.6E+01	3.4E+01	**1.9**	8.0E+01	<1
Nickel	5.7E+02	6.4E-01	0.0E+00	0.0E+00	6.4E-01	5.8E-01	1.2E+00	6.0E+01	<1	8.0E+01	<1
Selenium	9.0E+02	4.6E+01	0.0E+00	0.0E+00	4.6E+01	9.2E-01	4.7E+01	3.5E-01	**133.6**	1.1E+00	**44.5**
Vanadium	4.1E+02	1.2E-01	0.0E+00	0.0E+00	1.2E-01	4.2E-01	5.3E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.2E+05	1.7E+02	0.0E+00	0.0E+00	1.7E+02	1.2E+02	2.9E+02	1.6E+02	**1.8**	3.2E+02	<1
Organics											
Aroclor 1254	9.5E-02	7.8E-04	0.0E+00	0.0E+00	7.8E-04	9.7E-05	8.8E-04	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	1.7E-01	1.4E-03	0.0E+00	0.0E+00	1.4E-03	1.7E-04	1.5E-03	6.8E-02	<1	6.8E-01	<1
DDT	1.5E-02	1.0E-04	0.0E+00	0.0E+00	1.0E-04	1.5E-05	1.2E-04	4.5E+00	<1	2.3E+01	<1
Methoxychlor	1.9E+00	5.0E-02	0.0E+00	0.0E+00	5.0E-02	1.9E-03	5.2E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	9.7E-01	4.9E-02	0.0E+00	0.0E+00	4.9E-02	9.9E-04	5.0E-02	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-35
MEAN EXPOSURE ESTIMATE -- GROUNDHOG
RESTRICTED AREA
DuPONT EAST CHICAGO FACILITY
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	1.6E-01	0.0E+00	0.0E+00	1.6E-01	1.1E-01	2.6E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	2.1E+03	5.0E-01	0.0E+00	0.0E+00	5.0E-01	2.1E+00	2.6E+00	5.7E+00	<1	1.2E+01	<1
Barium	9.7E+02	7.4E+00	0.0E+00	0.0E+00	7.4E+00	9.9E-01	8.4E+00	5.2E+01	<1	2.6E+02	<1
Boron	2.6E+01	1.3E+00	0.0E+00	0.0E+00	1.3E+00	2.6E-02	1.3E+00	2.8E+01	<1	9.4E+01	<1
Cadmium	1.3E+02	4.5E-01	0.0E+00	0.0E+00	4.5E-01	1.3E-01	5.8E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.9E+01	1.1E-02	0.0E+00	0.0E+00	1.1E-02	3.0E-02	4.1E-02	7.4E+00	<1	3.7E+01	<1
Copper	5.2E+02	1.1E+00	0.0E+00	0.0E+00	1.1E+00	5.3E-01	1.7E+00	1.2E+01	<1	1.5E+01	<1
Lead	9.4E+03	2.3E+00	0.0E+00	0.0E+00	2.3E+00	9.6E+00	1.2E+01	3.4E+01	<1	8.0E+01	<1
Nickel	6.1E+01	1.2E-01	0.0E+00	0.0E+00	1.2E-01	6.2E-02	1.8E-01	6.0E+01	<1	8.0E+01	<1
Selenium	1.4E+02	6.0E+00	0.0E+00	0.0E+00	6.0E+00	1.4E-01	6.1E+00	3.5E-01	**17.5**	1.1E+00	**5.8**
Vanadium	5.5E+01	1.5E-02	0.0E+00	0.0E+00	1.5E-02	5.6E-02	7.2E-02	5.9E+00	<1	8.3E+00	<1
Zinc	2.3E+04	6.8E+01	0.0E+00	0.0E+00	6.8E+01	2.3E+01	9.1E+01	1.6E+02	<1	3.2E+02	<1
Organics											
Aroclor 1254	4.0E-02	3.3E-04	0.0E+00	0.0E+00	3.3E-04	4.1E-05	3.7E-04	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	6.4E-02	5.2E-04	0.0E+00	0.0E+00	5.2E-04	6.5E-05	5.9E-04	6.8E-02	<1	6.8E-01	<1
DDT	9.6E-03	6.6E-05	0.0E+00	0.0E+00	6.6E-05	9.8E-06	7.6E-05	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.5E-01	1.5E-02	0.0E+00	0.0E+00	1.5E-02	5.6E-04	1.5E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	4.7E-01	2.4E-02	0.0E+00	0.0E+00	2.4E-02	4.8E-04	2.4E-02	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-36
MAXIMUM EXPOSURE ESTIMATE -- WHITE-TAILED DEER
RESTRICTED AREA
DuPONT EAST CHICAGO FACILITY
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	3.3E-01	0.0E+00	0.0E+00	3.3E-01	2.6E-01	5.9E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	6.2E+04	9.7E-01	0.0E+00	0.0E+00	9.7E-01	1.8E+01	1.9E+01	5.7E+00	**3.4**	1.2E+01	**1.7**
Barium	7.7E+03	1.7E+01	0.0E+00	0.0E+00	1.7E+01	2.3E+00	1.9E+01	5.2E+01	<1	2.6E+02	<1
Boron	1.2E+02	1.7E+00	0.0E+00	0.0E+00	1.7E+00	3.5E-02	1.8E+00	2.8E+01	<1	9.4E+01	<1
Cadmium	1.0E+03	4.1E-01	0.0E+00	0.0E+00	4.1E-01	3.0E-01	7.1E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.3E+02	2.6E-02	0.0E+00	0.0E+00	2.6E-02	6.9E-02	9.4E-02	7.4E+00	<1	3.7E+01	<1
Copper	4.5E+03	7.6E-01	0.0E+00	0.0E+00	7.6E-01	1.3E+00	2.1E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.8E+04	1.8E+00	0.0E+00	0.0E+00	1.8E+00	1.7E+01	1.9E+01	3.4E+01	<1	8.0E+01	<1
Nickel	5.7E+02	1.9E-01	0.0E+00	0.0E+00	1.9E-01	1.7E-01	3.5E-01	6.0E+01	<1	8.0E+01	<1
Selenium	9.0E+02	1.3E+01	0.0E+00	0.0E+00	1.3E+01	2.6E-01	1.3E+01	3.5E-01	**38.6**	1.1E+00	**12.9**
Vanadium	4.1E+02	3.3E-02	0.0E+00	0.0E+00	3.3E-02	1.2E-01	1.5E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.2E+05	5.0E+01	0.0E+00	0.0E+00	5.0E+01	3.5E+01	8.5E+01	1.6E+02	<1	3.2E+02	<1
Organics											
Aroclor 1254	9.5E-02	2.3E-04	0.0E+00	0.0E+00	2.3E-04	2.8E-05	2.5E-04	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	1.7E-01	3.9E-04	0.0E+00	0.0E+00	3.9E-04	4.8E-05	4.4E-04	6.8E-02	<1	6.8E-01	<1
DDT	1.5E-02	3.0E-05	0.0E+00	0.0E+00	3.0E-05	4.4E-06	3.4E-05	4.5E+00	<1	2.3E+01	<1
Methoxychlor	1.9E+00	1.4E-02	0.0E+00	0.0E+00	1.4E-02	5.5E-04	1.5E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	9.7E-01	1.4E-02	0.0E+00	0.0E+00	1.4E-02	2.8E-04	1.5E-02	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-37
MEAN EXPOSURE ESTIMATE -- WHITE-TAILED DEER
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	4.5E-02	0.0E+00	0.0E+00	4.5E-02	3.1E-02	7.6E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	2.1E+03	1.5E-01	0.0E+00	0.0E+00	1.5E-01	6.2E-01	7.6E-01	5.7E+00	<1	1.2E+01	<1
Barium	9.7E+02	2.1E+00	0.0E+00	0.0E+00	2.1E+00	2.9E-01	2.4E+00	5.2E+01	<1	2.6E+02	<1
Boron	2.6E+01	3.8E-01	0.0E+00	0.0E+00	3.8E-01	7.6E-03	3.9E-01	2.8E+01	<1	9.4E+01	<1
Cadmium	1.3E+02	1.3E-01	0.0E+00	0.0E+00	1.3E-01	3.7E-02	1.7E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.9E+01	3.2E-03	0.0E+00	0.0E+00	3.2E-03	8.5E-03	1.2E-02	7.4E+00	<1	3.7E+01	<1
Copper	5.2E+02	3.3E-01	0.0E+00	0.0E+00	3.3E-01	1.5E-01	4.8E-01	1.2E+01	<1	1.5E+01	<1
Lead	9.4E+03	6.5E-01	0.0E+00	0.0E+00	6.5E-01	2.8E+00	3.4E+00	3.4E+01	<1	8.0E+01	<1
Nickel	6.1E+01	3.5E-02	0.0E+00	0.0E+00	3.5E-02	1.8E-02	5.3E-02	6.0E+01	<1	8.0E+01	<1
Selenium	1.4E+02	1.7E+00	0.0E+00	0.0E+00	1.7E+00	4.2E-02	1.8E+00	3.5E-01	**5.1**	1.1E+00	**1.7**
Vanadium	5.5E+01	4.5E-03	0.0E+00	0.0E+00	4.5E-03	1.6E-02	2.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	2.3E+04	2.0E+01	0.0E+00	0.0E+00	2.0E+01	6.6E+00	2.6E+01	1.6E+02	<1	3.2E+02	<1
Organics											
Aroclor 1254	4.0E-02	9.6E-05	0.0E+00	0.0E+00	9.6E-05	1.2E-05	1.1E-04	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	6.4E-02	1.5E-04	0.0E+00	0.0E+00	1.5E-04	1.9E-05	1.7E-04	6.8E-02	<1	6.8E-01	<1
DDT	9.6E-03	1.9E-05	0.0E+00	0.0E+00	1.9E-05	2.8E-06	2.2E-05	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.5E-01	4.3E-03	0.0E+00	0.0E+00	4.3E-03	1.6E-04	4.4E-03	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	4.7E-01	6.9E-03	0.0E+00	0.0E+00	6.9E-03	1.4E-04	7.0E-03	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-38
MAXIMUM EXPOSURE ESTIMATE -- DEER MOUSE
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	2.5E+00	9.9E+01	0.0E+00	1.0E+02	4.8E+00	1.1E+02	1.3E+01	**8.0**	6.7E+01	**1.6**
Arsenic	6.2E+04	7.4E+00	6.1E+01	0.0E+00	6.9E+01	3.3E+02	4.0E+02	5.7E+00	**70.6**	1.2E+01	**34.7**
Barium	7.7E+03	1.3E+02	7.9E+01	0.0E+00	2 1E+02	4.2E+01	2.5E+02	5.2E+01	**4.8**	2.6E+02	<1
Boron	1.2E+02	1.3E+01	1.3E+01	0.0E+00	2.6E+01	6.3E-01	2.7E+01	2.8E+01	<1	9.4E+01	<1
Cadmium	1.0E+03	3.1E+00	1.8E+02	0.0E+00	1.8E+02	5.5E+00	1.8E+02	5.1E+00	**36.2**	7.1E+00	**26.0**
Chromium	2.3E+02	2.0E-01	8.0E+00	0.0E+00	8.2E+00	1.3E+00	9.5E+00	7.4E+00	**1.3**	3.7E+01	<1
Copper	4.5E+03	5.8E+00	5.5E+00	0.0E+00	1.1E+01	2.4E+01	3.5E+01	1.2E+01	**3.0**	1.5E+01	**2.3**
Lead	5.8E+04	1.4E+01	6.6E+02	0.0E+00	6.7E+02	3.1E+02	9.9E+02	3.4E+01	**29.0**	8.0E+01	**12.3**
Nickel	5.7E+02	1.4E+00	6.8E+01	0.0E+00	6.9E+01	3.1E+00	7.2E+01	6.0E+01	**1.2**	8.0E+01	<1
Selenium	9.0E+02	1.0E+02	1.5E+01	0.0E+00	1.2E+02	4.9E+00	1.2E+02	3.5E-01	**345.5**	1.1E+00	**115.2**
Vanadium	4.1E+02	2.5E-01	1.9E+00	0.0E+00	2.2E+00	2.2E+00	4.4E+00	5.9E+00	<1	8.3E+00	<1
Zinc	1.2E+05	3.8E+02	4.5E+02	0.0E+00	8.3E+02	6.5E+02	1.5E+03	1.6E+02	**9.2**	3.2E+02	**4.6**
Organics											
Aroclor 1254	9.5E-02	1.7E-03	1.9E-02	0.0E+00	2.0E-02	5.1E-04	2.1E-02	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	1.7E-01	3.0E-03	4.0E-02	0.0E+00	4.3E-02	8.9E-04	4.3E-02	6.8E-02	<1	6.8E-01	<1
DDT	1.5E-02	2.3E-04	2.4E-02	0.0E+00	2.5E-02	8.1E-05	2.5E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	1.9E+00	1.1E-01	8.1E-01	0.0E+00	9.2E-01	1.0E-02	9.3E-01	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	9.7E-01	1.1E-01	1.1E-01	0.0E+00	2.2E-01	5.2E-03	2.2E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-39
MEAN EXPOSURE ESTIMATE -- DEER MOUSE
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	3.5E-01	1.2E+01	0.0E+00	1.2E+01	5.7E-01	1.3E+01	1.3E+01	<1	6.7E+01	<1
Arsenic	2.1E+03	1.1E+00	5.7E+00	0.0E+00	6.8E+00	1.1E+01	1.8E+01	5.7E+00	**3.2**	1.2E+01	**1.6**
Barium	9.7E+02	1.6E+01	9.9E+00	0.0E+00	2.6E+01	5.2E+00	3.2E+01	5.2E+01	<1	2.6E+02	<1
Boron	2.6E+01	2.9E+00	2.9E+00	0.0E+00	5.8E+00	1.4E-01	5.9E+00	2.8E+01	<1	9.4E+01	<1
Cadmium	1.3E+02	9.9E-01	4.4E+01	0.0E+00	4.5E+01	6.7E-01	4.6E+01	5.1E+00	**9.0**	7.1E+00	**6.4**
Chromium	2.9E+01	2.4E-02	1.0E+00	0.0E+00	1.0E+00	1.6E-01	1.2E+00	7.4E+00	<1	3.7E+01	<1
Copper	5.2E+02	2.5E+00	3.1E+00	0.0E+00	5.6E+00	2.8E+00	8.4E+00	1.2E+01	<1	1.5E+01	<1
Lead	9.4E+03	5.0E+00	1.5E+02	0.0E+00	1.6E+02	5.1E+01	2.1E+02	3.4E+01	**6.1**	8.0E+01	**2.6**
Nickel	6.1E+01	2.7E-01	7.3E+00	0.0E+00	7.5E+00	3.3E-01	7.8E+00	6.0E+01	<1	8.0E+01	<1
Selenium	1.4E+02	1.3E+01	3.9E+00	0.0E+00	1.7E+01	7.6E-01	1.8E+01	3.5E-01	**51.0**	1.1E+00	**17.0**
Vanadium	5.5E+01	3.4E-02	2.6E-01	0.0E+00	2.9E-01	3.0E-01	5.9E-01	5.9E+00	<1	8.3E+00	<1
Zinc	2.3E+04	1.5E+02	2.6E+02	0.0E+00	4.1E+02	1.2E+02	5.3E+02	1.6E+02	**3.3**	3.2E+02	**1.7**
Organics											
Aroclor 1254	4.0E-02	7.3E-04	5.8E-03	0.0E+00	6.6E-03	2.2E-04	6.8E-03	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	6.4E-02	1.2E-03	1.1E-02	0.0E+00	1.2E-02	3.4E-04	1.2E-02	6.8E-02	<1	6.8E-01	<1
DDT	9.6E-03	1.5E-04	1.7E-02	0.0E+00	1.7E-02	5.2E-05	1.7E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.5E-01	3.3E-02	2.4E-01	0.0E+00	2.7E-01	3.0E-03	2.8E-01	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	4.7E-01	5.2E-02	5.2E-02	0.0E+00	1.0E-01	2.5E-03	1.1E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-40
MAXIMUM EXPOSURE ESTIMATE -- SHORT-TAILED SHREW
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	0.0E+00	1.2E+02	0.0E+00	1.2E+02	1.5E+01	1.3E+02	1.3E+01	**10.1**	6.7E+01	**2.0**
Arsenic	6.2E+04	0.0E+00	7.3E+01	0.0E+00	7.3E+01	1.1E+03	1.2E+03	5.7E+00	**202.4**	1.2E+01	**99.4**
Barium	7.7E+03	0.0E+00	9.4E+01	0.0E+00	9.4E+01	1.3E+02	2.3E+02	5.2E+01	**4.4**	2.6E+02	<1
Boron	1.2E+02	0.0E+00	1.6E+01	0.0E+00	1.6E+01	2.1E+00	1.8E+01	2.8E+01	<1	9.4E+01	<1
Cadmium	1.0E+03	0.0E+00	2.1E+02	0.0E+00	2.1E+02	1.8E+01	2.3E+02	5.1E+00	**44.7**	7.1E+00	**32.1**
Chromium	2.3E+02	0.0E+00	9.6E+00	0.0E+00	9.6E+00	4.1E+00	1.4E+01	7.4E+00	**1.8**	3.7E+01	<1
Copper	4.5E+03	0.0E+00	6.6E+00	0.0E+00	6.6E+00	7.8E+01	8.4E+01	1.2E+01	**7.2**	1.5E+01	**5.6**
Lead	5.8E+04	0.0E+00	7.9E+02	0.0E+00	7.9E+02	1.0E+03	1.8E+03	3.4E+01	**53.0**	8.0E+01	**22.5**
Nickel	5.7E+02	0.0E+00	8.1E+01	0.0E+00	8.1E+01	9.9E+00	9.1E+01	6.0E+01	**1.5**	8.0E+01	**1.1**
Selenium	9.0E+02	0.0E+00	1.8E+01	0.0E+00	1.8E+01	1.6E+01	3.4E+01	3.5E-01	**95.9**	1.1E+00	**32.0**
Vanadium	4.1E+02	0.0E+00	2.3E+00	0.0E+00	2.3E+00	7.2E+00	9.5E+00	5.9E+00	**1.6**	8.3E+00	**1.1**
Zinc	1.2E+05	0.0E+00	5.4E+02	0.0E+00	5.4E+02	2.1E+03	2.6E+03	1.6E+02	**16.4**	3.2E+02	**8.2**
Organics											
Aroclor 1254	9.5E-02	0.0E+00	2.2E-02	0.0E+00	2.2E-02	1.7E-03	2.4E-02	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	1.7E-01	0.0E+00	4.7E-02	0.0E+00	4.7E-02	2.9E-03	5.0E-02	6.8E-02	<1	6.8E-01	<1
DDT	1.5E-02	0.0E+00	2.9E-02	0.0E+00	2.9E-02	2.6E-04	2.9E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	1.9E+00	0.0E+00	9.7E-01	0.0E+00	9.7E-01	3.3E-02	1.0E+00	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	9.7E-01	0.0E+00	1.3E-01	0.0E+00	1.3E-01	1.7E-02	1.5E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-41
MEAN EXPOSURE ESTIMATE -- SHORT-TAILED SHREW
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	0.0E+00	1.4E+01	0.0E+00	1.4E+01	1.8E+00	1.6E+01	1.3E+01	**1.2**	6.7E+01	<1
Arsenic	2.1E+03	0.0E+00	6.9E+00	0.0E+00	6.9E+00	3.7E+01	4.3E+01	5.7E+00	**7.6**	1.2E+01	**3.7**
Barium	9.7E+02	0.0E+00	1.2E+01	0.0E+00	1.2E+01	1.7E+01	2.9E+01	5.2E+01	<1	2.6E+02	<1
Boron	2.6E+01	0.0E+00	3.5E+00	0.0E+00	3.5E+00	4.5E-01	3.9E+00	2.8E+01	<1	9.4E+01	<1
Cadmium	1.3E+02	0.0E+00	5.3E+01	0.0E+00	5.3E+01	2.2E+00	5.5E+01	5.1E+00	**10.8**	7.1E+00	**7.7**
Chromium	2.9E+01	0.0E+00	1.2E+00	0.0E+00	1.2E+00	5.1E-01	1.7E+00	7.4E+00	<1	3.7E+01	<1
Copper	5.2E+02	0.0E+00	3.7E+00	0.0E+00	3.7E+00	9.0E+00	1.3E+01	1.2E+01	**1.1**	1.5E+01	<1
Lead	9.4E+03	0.0E+00	1.8E+02	0.0E+00	1.8E+02	1.6E+02	3.4E+02	3.4E+01	**10.1**	8.0E+01	**4.3**
Nickel	6.1E+01	0.0E+00	8.7E+00	0.0E+00	8.7E+00	1.1E+00	9.7E+00	6.0E+01	<1	8.0E+01	<1
Selenium	1.4E+02	0.0E+00	4.6E+00	0.0E+00	4.6E+00	2.5E+00	7.1E+00	3.5E-01	**20.3**	1.1E+00	**6.8**
Vanadium	5.5E+01	0.0E+00	3.1E-01	0.0E+00	3.1E-01	9.6E-01	1.3E+00	5.9E+00	<1	8.3E+00	<1
Zinc	2.3E+04	0.0E+00	3.1E+02	0.0E+00	3.1E+02	3.9E+02	7.0E+02	1.6E+02	**4.4**	3.2E+02	**2.2**
Organics											
Aroclor 1254	4.0E-02	0.0E+00	7.0E-03	0.0E+00	7.0E-03	7.0E-04	7.7E-03	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	6.4E-02	0.0E+00	1.3E-02	0.0E+00	1.3E-02	1.1E-03	1.4E-02	6.8E-02	<1	6.8E-01	<1
DDT	9.6E-03	0.0E+00	2.0E-02	0.0E+00	2.0E-02	1.7E-04	2.0E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.5E-01	0.0E+00	2.9E-01	0.0E+00	2.9E-01	9.7E-03	3.0E-01	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	4.7E-01	0.0E+00	6.3E-02	0.0E+00	6.3E-02	8.2E-03	7.1E-02	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-42
MAXIMUM EXPOSURE ESTIMATE -- RED FOX
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	8.8E+02	7.4E-02	0.0E+00	5.2E-03	7.9E-02	8.0E-01	8.8E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	6.2E+04	2.1E-01	0.0E+00	1.9E+00	2.1E+00	5.6E+01	5.9E+01	5.7E+00	**10.3**	1.2E+01	**5.0**
Barium	7.7E+03	3.8E+00	0.0E+00	1.3E+01	1.7E+01	7.0E+00	2.4E+01	5.2E+01	<1	2.6E+02	<1
Boron	1.2E+02	3.8E-01	0.0E+00	3.5E+00	3.8E+00	1.1E-01	3.9E+00	2.8E+01	<1	9.4E+01	<1
Cadmium	1.0E+03	9.1E-02	0.0E+00	3.2E-01	4.1E-01	9.3E-01	1.3E+00	5.1E+00	<1	7.1E+00	<1
Chromium	2.3E+02	5.7E-03	0.0E+00	3.7E-01	3.8E-01	2.1E-01	5.9E-01	7.4E+00	<1	3.7E+01	<1
Copper	4.5E+03	1.7E-01	0.0E+00	1 1E+00	1.2E+00	4.1E+00	5.3E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.8E+04	4.0E-01	0.0E+00	4.7E+00	5.1E+00	5.3E+01	5.8E+01	3.4E+01	**1.7**	8.0E+01	<1
Nickel	5.7E+02	4.1E-02	0.0E+00	4.4E-01	4.8E-01	5.2E-01	1.0E+00	6.0E+01	<1	8.0E+01	<1
Selenium	9.0E+02	2.9E+00	0.0E+00	2.5E-01	3.2E+00	8.2E-01	4.0E+00	3.5E-01	**11.4**	1.1E+00	**3.8**
Vanadium	4.1E+02	7.4E-03	0.0E+00	1.7E-04	7.5E-03	3.7E-01	3.8E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.2E+05	1.1E+01	0.0E+00	6.1E+00	1.7E+01	1.1E+02	1.3E+02	1.6E+02	<1	3.2E+02	<1
Organics											
Aroclor 1254	9.5E-02	5.0E-05	0.0E+00	5.0E-03	5.0E-03	8.6E-05	5.1E-03	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	1.7E-01	8.7E-05	0.0E+00	9.1E-03	9.2E-03	1.5E-04	9.3E-03	6.8E-02	<1	6.8E-01	<1
DDT	1.5E-02	6.6E-06	0.0E+00	3.1E-02	3.1E-02	1.4E-05	3.1E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	1.9E+00	3.2E-03	0.0E+00	7.6E-03	1.1E-02	1.7E-03	1.3E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	9.7E-01	3.2E-03	0.0E+00	2.8E-02	3.2E-02	8.8E-04	3.2E-02	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-43
MEAN EXPOSURE ESTIMATE -- RED FOX
RESTRICTED AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.1E+02	1.0E-02	0.0E+00	6.1E-04	1.1E-02	9.6E-02	1.1E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	2.1E+03	3.2E-02	0.0E+00	1.2E-01	1.5E-01	1.9E+00	2.1E+00	5.7E+00	<1	1.2E+01	<1
Barium	9.7E+02	4.7E-01	0.0E+00	1.6E+00	2.1E+00	8.9E-01	3.0E+00	5.2E+01	<1	2.6E+02	<1
Boron	2.6E+01	8.4E-02	0.0E+00	7.5E-01	8.4E-01	2.3E-02	8.6E-01	2.8E+01	<1	9.4E+01	<1
Cadmium	1.3E+02	2.9E-02	0.0E+00	9.7E-02	1.3E-01	1.1E-01	2.4E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.9E+01	7.1E-04	0.0E+00	8.1E-02	8.1E-02	2.6E-02	1.1E-01	7.4E+00	<1	3.7E+01	<1
Copper	5.2E+02	7.3E-02	0.0E+00	7.3E-01	8.0E-01	4.7E-01	1.3E+00	1.2E+01	<1	1.5E+01	<1
Lead	9.4E+03	1.4E-01	0.0E+00	1.8E+00	2.0E+00	8.6E+00	1.1E+01	3.4E+01	<1	8.0E+01	<1
Nickel	6.1E+01	7.7E-03	0.0E+00	1.6E-01	1.6E-01	5.6E-02	2.2E-01	6.0E+01	<1	8.0E+01	<1
Selenium	1.4E+02	3.8E-01	0.0E+00	1.2E-01	5.1E-01	1.3E-01	6.4E-01	3.5E-01	**1.8**	1.1E+00	<1
Vanadium	5.5E+01	9.9E-04	0.0E+00	2.2E-05	1.0E-03	5.0E-02	5.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	2.3E+04	4.3E+00	0.0E+00	5.4E+00	9.7E+00	2.1E+01	3.0E+01	1.6E+02	<1	3.2E+02	<1
Organics											
Aroclor 1254	4.0E-02	2.1E-05	0.0E+00	1.9E-03	2.0E-03	3.7E-05	2.0E-03	6.8E-02	<1	6.8E-01	<1
Aroclor 1260	6.4E-02	3.3E-05	0.0E+00	3.2E-03	3.2E-03	5.8E-05	3.3E-03	6.8E-02	<1	6.8E-01	<1
DDT	9.6E-03	4.2E-06	0.0E+00	2.4E-02	2.4E-02	8.8E-06	2.4E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.5E-01	9.5E-04	0.0E+00	2.3E-03	3.2E-03	5.0E-04	3.7E-03	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	4.7E-01	1.5E-03	0.0E+00	1.4E-02	1.5E-02	4.3E-04	1.6E-02	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-44
DIRECT EXPOSURE RISK ESTIMATES FOR PLANTS
RE-DEVELOPMENT AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Parameter	Units	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ
ANTIMONY	mg/kg	5	a	0.964	7360			186	60	67	43	ECH-S-S10D-01S(0-2)	1472
ARSENIC	mg/kg	18	b	4.12	99400			1773	79	79	62	ECH-S-S4-02S(0-2)	5522
BARIUM	mg/kg	500	a	10.2	13900			1693	66	66	26	BERA-A6-02	27.8
BORON	mg/kg	0.5	a	50.7	69.3			31.8	2	4	2	ECH-S-S3-03S(0-2)	139
CADMIUM	mg/kg	32	b	0.076900002	5930			163	57	57	19	ECH-S-RFI2-S10D-4(0-2)	185
CHROMIUM	mg/kg	1	a	2.8	895			58.6	57	57	57	ECH-S-RFI2-S10A-2(0-1.5)	895
COBALT	mg/kg	13	b	0.298	22.6			6.81	14	14	3	BERA-S2D-02 (DUP)	1.74
COPPER	mg/kg	100	a	2.4	5100			578	66	66	39	ECH-S-RFI2-S10D-4(0-2)	51
CYANIDE	mg/kg	NA	--	4.8	58			18.1	5	9	--	ECH-S-S7-01S(0-2)	
DDT	mg/kg	NA	--	0.0183	2.43			0.333	13	14	--	ECH-S-A2E-03S(0-2)	
LEAD	mg/kg	120	b	40.6	147000			18943	66	66	59	BERA-S10B-01(0-1)	1225
MANGANESE	mg/kg	500	a	23.6	485			244	14	14	0	BERA-S2D-01	<1
MERCURY	mg/kg	0.3	a2	0.0115	52.1			9.56	14	14	10	BERA-S10B-01(1-2)	174
METHOXYCHLOR	mg/kg	NA	--	0.0046	0.512			0.093	8	13	--	ECH-S-A2E-03S(0-2)	
NICKEL	mg/kg	30	a	0.343	122			24.5	52	52	12	ECH-S-RFI2-S21-2(0-2)	4.1
SELENIUM	mg/kg	1	a	0.649	239			10.7	50	52	46	ECH-S-RFI2-S10D-4(0-2)	239
SILVER	mg/kg	2	a	0.668	100			13.8	12	14	5	BERA-S10B-01(1-2)	50.0
THALLIUM	mg/kg	1	a	0.0824	7.21			1.52	14	14	5	BERA-A6-03	7
VANADIUM	mg/kg	2	a	0.524	152			27.3	52	52	50	ECH-S-RFI2-A2E-1(0-2)	76.0
ZINC	mg/kg	50	a	11.3	130000			18113	71	71	69	ECH-S-S7-01S(0-2)-DUP	2600

1) Sources:

a - Efroymson et al 1997

1 - value for fluorine

NA - Screening value not available

TABLE F-45
DIRECT EXPOSURE RISK ESTIMATES FOR SOIL INVERTEBRATES
RE-DEVELOPMENT AREA
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Parameter	Units	Screening Value	Screening Value Source[1]	Minimum Detection	Maximum Detection	Minimum MDL	Maximum MDL	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedances	Location of Detection Max	HQ
ANTIMONY	mg/kg	78	b	0.964	7360			186	60	67	13	ECH-S-S10D-01S(0-2)	94
ARSENIC	mg/kg	60	a	4.12	99400			1773	79	79	43	ECH-S-S4-02S(0-2)	1657
BARIUM	mg/kg	330	b	10.2	13900			1693	66	66	34	BERA-A6-02	42.1
BORON	mg/kg	NA	--	50.7	69.3			31.8	2	4	--	ECH-S-S3-03S(0-2)	
CADMIUM	mg/kg	140	b	0.076900002	5930			163	57	57	7	ECH-S-RFI2-S10D-4(0-2)	42
CHROMIUM	mg/kg	0.4	a	2.8	895			58.6	57	57	57	ECH-S-RFI2-S10A-2(0-1.5)	2238
COBALT	mg/kg	NA	--	0.298	22.6			6.81	14	14	--	BERA-S2D-02 (DUP)	
COPPER	mg/kg	60	a	2.4	5100			578	66	66	48	ECH-S-RFI2-S10D-4(0-2)	85
CYANIDE	mg/kg	NA	--	4.8	58			18.1	5	9	--	ECH-S-S7-01S(0-2)	
DDT	mg/kg	NA	--	0.0183	2.43			0.333	13	14	--	ECH-S-A2E-03S(0-2)	
LEAD	mg/kg	1700	b	40.6	147000			18943	66	66	33	BERA-S10B-01(0-1)	86
MANGANESE	mg/kg	NA	--	23.6	485			244	14	14	--	BERA-S2D-01	
MERCURY	mg/kg	0.1	a2	0.0115	52.1			9.56	14	14	12	BERA-S10B-01(1-2)	521
METHOXYCHLOR	mg/kg	NA	--	0.0046	0.512			0.093	8	13	--	ECH-S-A2E-03S(0-2)	
NICKEL	mg/kg	200	a	0.343	122			24.5	52	52	0	ECH-S-RFI2-S21-2(0-2)	<1
SELENIUM	mg/kg	70	a	0.649	239			10.7	50	52	1	ECH-S-RFI2-S10D-4(0-2)	3
SILVER	mg/kg	NA	--	0.668	100			13.8	12	14	--	BERA-S10B-01(1-2)	
THALLIUM	mg/kg	NA	--	0.0824	7.21			1.52	14	14	--	BERA-A6-03	
VANADIUM	mg/kg	NA	--	0.524	152			27.3	52	52	--	ECH-S-RFI2-A2E-1(0-2)	
ZINC	mg/kg	100	a	11.3	130000			18113	71	71	66	ECH-S-S7-01S(0-2)-DUP	1300

1) Sources:
a - Efroymson et al. 1997
1 - value for chlorobenzene
2 - inorganic and organic
b - Eco-SSLs

TABLE F-46
MAXIMUM EXPOSURE ESTIMATE - CANADA GOOSE
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	5.3E+00	0.0E+00	0.0E+00	5.3E+00	1.9E+01	2.4E+01	NA	--	NA	--
Arsenic	9.9E+04	2.7E+00	0.0E+00	0.0E+00	2.7E+00	2.6E+02	2.6E+02	5.5E+00	**47.6**	2.2E+01	**11.9**
Barium	1.4E+04	6.6E+01	0.0E+00	0.0E+00	6.6E+01	3.6E+01	1.0E+02	2.1E+02	<1	4.2E+02	<1
Cadmium	5.9E+03	2.3E+00	0.0E+00	0.0E+00	2.3E+00	1.5E+01	1.8E+01	1.9E+00	**9.4**	2.1E+01	<1
Chromium	9.0E+02	2.1E-01	0.0E+00	0.0E+00	2.1E-01	2.3E+00	2.5E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	2.3E+01	1.4E-02	0.0E+00	0.0E+00	1.4E-02	5.9E-02	7.3E-02	7.6E+00	<1	3.8E+01	<1
Copper	5.1E+03	1.7E+00	0.0E+00	0.0E+00	1.7E+00	1.3E+01	1.5E+01	3.3E+01	<1	6.2E+01	<1
Lead	1.5E+05	6.6E+00	0.0E+00	0.0E+00	6.6E+00	3.8E+02	3.9E+02	7.4E+00	**52.6**	3.7E+01	**10.5**
Manganese	4.9E+02	3.9E+00	0.0E+00	0.0E+00	3.9E+00	1.3E+00	5.1E+00	9.8E+02	<1	4.9E+03	<1
Mercury	5.2E+01	9.9E-02	0.0E+00	0.0E+00	9.9E-02	1.4E-01	2.3E-01	4.5E-01	<1	9.1E-01	<1
Nickel	1.2E+02	1.3E-01	0.0E+00	0.0E+00	1.3E-01	3.2E-01	4.4E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+02	6.6E+00	0.0E+00	0.0E+00	6.6E+00	6.2E-01	7.3E+00	4.0E-01	**18.2**	8.0E-01	**9.1**
Silver	1.0E+02	1.3E+00	0.0E+00	0.0E+00	1.3E+00	2.6E-01	1.5E+00	1.5E+01	<1	4.4E+01	<1
Thallium	7.2E+00	9.2E-04	0.0E+00	0.0E+00	9.2E-04	1.9E-02	2.0E-02	NA	--	NA	--
Vanadium	1.5E+02	2.7E-02	0.0E+00	0.0E+00	2.7E-02	4.0E-01	4.2E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.3E+05	1.1E+02	0.0E+00	0.0E+00	1.1E+02	3.4E+02	4.5E+02	1.5E+01	**31.1**	1.3E+02	**3.4**
Organics											
DDT	2.4E+00	1.0E-02	0.0E+00	0.0E+00	1.0E-02	6.3E-03	1.7E-02	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.1E-01	8.5E-03	0.0E+00	0.0E+00	8.5E-03	1.3E-03	9.9E-03	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	5.8E+01	1.8E+00	0.0E+00	0.0E+00	1.8E+00	1.5E-01	2.0E+00	5.2E-01	**3.8**	6.8E-01	**2.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-47
MEAN EXPOSURE ESTIMATE - CANADA GOOSE
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	1.7E-01	0.0E+00	0.0E+00	1.7E-01	4.8E-01	6.5E-01	NA	--	NA	--
Arsenic	1.8E+03	2.9E-01	0.0E+00	0.0E+00	2.9E-01	4.6E+00	4.9E+00	5.5E+00	<1	2.2E+01	<1
Barium	1.7E+03	8.1E+00	0.0E+00	0.0E+00	8.1E+00	4.4E+00	1.2E+01	2.1E+02	<1	4.2E+02	<1
Cadmium	1.6E+02	3.2E-01	0.0E+00	0.0E+00	3.2E-01	4.2E-01	7.5E-01	1.9E+00	<1	2.1E+01	<1
Chromium	5.9E+01	1.4E-02	0.0E+00	0.0E+00	1.4E-02	1.5E-01	1.7E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	6.8E+00	4.3E-03	0.0E+00	0.0E+00	4.3E-03	1.8E-02	2.2E-02	7.6E+00	<1	3.8E+01	<1
Copper	5.8E+02	7.4E-01	0.0E+00	0.0E+00	7.4E-01	1.5E+00	2.2E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.9E+04	2.1E+00	0.0E+00	0.0E+00	2.1E+00	4.9E+01	5.1E+01	7.4E+00	**6.9**	3.7E+01	**1.4**
Manganese	2.4E+02	1.9E+00	0.0E+00	0.0E+00	1.9E+00	6.4E-01	2.6E+00	9.8E+02	<1	4.9E+03	<1
Mercury	9.6E+00	4.0E-02	0.0E+00	0.0E+00	4.0E-02	2.5E-02	6.4E-02	4.5E-01	<1	9.1E-01	<1
Nickel	2.5E+01	3.8E-02	0.0E+00	0.0E+00	3.8E-02	6.4E-02	1.0E-01	8.0E+01	<1	1.1E+02	<1
Selenium	1.1E+01	2.2E-01	0.0E+00	0.0E+00	2.2E-01	2.8E-02	2.5E-01	4.0E-01	<1	8.0E-01	<1
Silver	1.4E+01	1.8E-01	0.0E+00	0.0E+00	1.8E-01	3.6E-02	2.1E-01	1.5E+01	<1	4.4E+01	<1
Thallium	1.5E+00	1.9E-04	0.0E+00	0.0E+00	1.9E-04	4.0E-03	4.2E-03	NA	--	NA	--
Vanadium	2.7E+01	4.8E-03	0.0E+00	0.0E+00	4.8E-03	7.1E-02	7.6E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	3.7E+01	0.0E+00	0.0E+00	3.7E+01	4.7E+01	8.5E+01	1.5E+01	**5.8**	1.3E+02	<1
Organics											
DDT	3.3E-01	1.4E-03	0.0E+00	0.0E+00	1.4E-03	8.7E-04	2.3E-03	3.0E+00	<1	1.5E+01	<1
Methoxychlor	9.3E-02	1.5E-03	0.0E+00	0.0E+00	1.5E-03	2.4E-04	1.8E-03	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	1.8E+01	5.7E-01	0.0E+00	0.0E+00	5.7E-01	4.7E-02	6.2E-01	5.2E-01	**1.2**	6.8E-01	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-48
MAXIMUM EXPOSURE ESTIMATE - SONG SPARROW
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	9.1E+00	1.2E+03	0.0E+00	1.2E+03	1.4E+02	1.4E+03	NA	--	NA	--
Arsenic	9.9E+04	4.7E+00	1.3E+02	0.0E+00	1.3E+02	1.9E+03	2.0E+03	5.5E+00	**372.2**	2.2E+01	**93.0**
Barium	1.4E+04	1.1E+02	2.1E+02	0.0E+00	3.2E+02	2.7E+02	5.9E+02	2.1E+02	**2.8**	4.2E+02	**1.4**
Cadmium	5.9E+03	4.0E+00	8.2E+02	0.0E+00	8.3E+02	1.1E+02	9.4E+02	1.9E+00	**496.1**	2.1E+01	**44.7**
Chromium	9.0E+02	3.7E-01	4.5E+01	0.0E+00	4.5E+01	1.7E+01	6.3E+01	3.8E+01	**1.7**	7.5E+01	<1
Cobalt	2.3E+01	2.5E-02	4.5E-01	0.0E+00	4.8E-01	4.4E-01	9.1E-01	7.6E+00	<1	3.8E+01	<1
Copper	5.1E+03	3.0E+00	8.4E+00	0.0E+00	1.1E+01	9.8E+01	1.1E+02	3.3E+01	**3.3**	6.2E+01	**1.8**
Lead	1.5E+05	1.1E+01	2.0E+03	0.0E+00	2.1E+03	2.8E+03	4.9E+03	7.4E+00	**660.7**	3.7E+01	**132.1**
Manganese	4.9E+02	6.6E+00	5.0E+00	0.0E+00	1.2E+01	9.4E+00	2.1E+01	9.8E+02	<1	4.9E+03	<1
Mercury	5.2E+01	1.7E-01	6.6E-01	0.0E+00	8.3E-01	1.0E+00	1.8E+00	4.5E-01	**4.1**	9.1E-01	**2.0**
Nickel	1.2E+02	2.2E-01	2.1E+01	0.0E+00	2.1E+01	2.4E+00	2.4E+01	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+02	1.1E+01	8.3E+00	0.0E+00	2.0E+01	4.6E+00	2.4E+01	4.0E-01	**61.0**	8.0E-01	**30.5**
Silver	1.0E+02	2.2E+00	3.4E+01	0.0E+00	3.6E+01	1.9E+00	3.8E+01	1.5E+01	**2.6**	4.4E+01	<1
Thallium	7.2E+00	1.6E-03	1.2E+00	0.0E+00	1.2E+00	1.4E-01	1.3E+00	NA	--	NA	--
Vanadium	1.5E+02	4.6E-02	1.0E+00	0.0E+00	1.1E+00	2.9E+00	4.0E+00	1.1E+01	<1	5.7E+01	<1
Zinc	1.3E+05	1.9E+02	6.8E+02	0.0E+00	8.7E+02	2.5E+03	3.4E+03	1.5E+01	**233.1**	1.3E+02	**25.8**
Organics											
DDT	2.4E+00	1.8E-02	3.0E+00	0.0E+00	3.0E+00	4.7E-02	3.0E+00	3.0E+00	**1.0**	1.5E+01	<1
Methoxychlor	5.1E-01	1.5E-02	3.2E-01	0.0E+00	3.4E-01	9.9E-03	3.5E-01	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	5.8E+01	3.2E+00	9.5E+00	0.0E+00	1.3E+01	1.1E+00	1.4E+01	5.2E-01	**26.6**	6.8E-01	**20.3**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-49
MEAN EXPOSURE ESTIMATE - SONG SPARROW
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	2.9E-01	3.1E+01	0.0E+00	3.1E+01	3.6E+00	3.4E+01	NA	--	NA	--
Arsenic	1.8E+03	4.9E-01	7.5E+00	0.0E+00	8.0E+00	3.4E+01	4.2E+01	5.5E+00	**7.7**	2.2E+01	**1.9**
Barium	1.7E+03	1.4E+01	2.5E+01	0.0E+00	3.9E+01	3.3E+01	7.2E+01	2.1E+02	<1	4.2E+02	<1
Cadmium	1.6E+02	5.6E-01	7.7E+01	0.0E+00	7.7E+01	3.1E+00	8.1E+01	1.9E+00	**42.4**	2.1E+01	**3.8**
Chromium	5.9E+01	2.4E-02	2.9E+00	0.0E+00	3.0E+00	1.1E+00	4.1E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	6.8E+00	7.5E-03	1.4E-01	0.0E+00	1.4E-01	1.3E-01	2.8E-01	7.6E+00	<1	3.8E+01	<1
Copper	5.8E+02	1.3E+00	4.7E+00	0.0E+00	6.0E+00	1.1E+01	1.7E+01	3.3E+01	<1	6.2E+01	<1
Lead	1.9E+04	3.6E+00	3.9E+02	0.0E+00	3.9E+02	3.7E+02	7.6E+02	7.4E+00	**102.4**	3.7E+01	**20.5**
Manganese	2.4E+02	3.3E+00	3.1E+00	0.0E+00	6.4E+00	4.7E+00	1.1E+01	9.8E+02	<1	4.9E+03	<1
Mercury	9.6E+00	6.8E-02	3.7E-01	0.0E+00	4.4E-01	1.8E-01	6.3E-01	4.5E-01	**1.4**	9.1E-01	<1
Nickel	2.5E+01	6.6E-02	4.3E+00	0.0E+00	4.3E+00	4.7E-01	4.8E+00	8.0E+01	<1	1.1E+02	<1
Selenium	1.1E+01	3.8E-01	8.6E-01	0.0E+00	1.2E+00	2.1E-01	1.4E+00	4.0E-01	**3.6**	8.0E-01	**1.8**
Silver	1.4E+01	3.0E-01	4.6E+00	0.0E+00	4.9E+00	2.7E-01	5.2E+00	1.5E+01	<1	4.4E+01	<1
Thallium	1.5E+00	3.3E-04	2.5E-01	0.0E+00	2.5E-01	2.9E-02	2.8E-01	NA	--	NA	--
Vanadium	2.7E+01	8.2E-03	1.9E-01	0.0E+00	2.0E-01	5.3E-01	7.2E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	6.4E+01	3.5E+02	0.0E+00	4.2E+02	3.5E+02	7.7E+02	1.5E+01	**53.0**	1.3E+02	**5.9**
Organics											
DDT	3.3E-01	2.5E-03	5.3E-01	0.0E+00	5.3E-01	6.4E-03	5.4E-01	3.0E+00	<1	1.5E+01	<1
Methoxychlor	9.3E-02	2.7E-03	5.9E-02	0.0E+00	6.2E-02	1.8E-03	6.3E-02	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	1.8E+01	9.9E-01	3.0E+00	0.0E+00	4.0E+00	3.5E-01	4.3E+00	5.2E-01	**8.3**	6.8E-01	**6.3**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-50
MAXIMUM EXPOSURE ESTIMATE - AMERICAN ROBIN
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	1.5E+01	4.4E+02	0.0E+00	4.6E+02	4.6E+01	5.0E+02	NA	--	NA	--
Arsenic	9.9E+04	7.7E+00	4.6E+01	0.0E+00	5.3E+01	6.2E+02	6.7E+02	5.5E+00	**122.4**	2.2E+01	**30.6**
Barium	1.4E+04	1.9E+02	7.6E+01	0.0E+00	2.6E+02	8.7E+01	3.5E+02	2.1E+02	**1.7**	4.2E+02	<1
Cadmium	5.9E+03	6.6E+00	3.0E+02	0.0E+00	3.1E+02	3.7E+01	3.4E+02	1.9E+00	**181.2**	2.1E+01	**16.3**
Chromium	9.0E+02	6.0E-01	1.6E+01	0.0E+00	1.7E+01	5.6E+00	2.3E+01	3.8E+01	<1	7.5E+01	<1
Cobalt	2.3E+01	4.1E-02	1.7E-01	0.0E+00	2.1E-01	1.4E-01	3.5E-01	7.6E+00	<1	3.8E+01	<1
Copper	5.1E+03	4.9E+00	3.0E+00	0.0E+00	8.0E+00	3.2E+01	4.0E+01	3.3E+01	**1.2**	6.2E+01	<1
Lead	1.5E+05	1.9E+01	7.5E+02	0.0E+00	7.6E+02	9.2E+02	1.7E+03	7.4E+00	**227.1**	3.7E+01	**45.4**
Manganese	4.9E+02	1.1E+01	1.8E+00	0.0E+00	1.3E+01	3.0E+00	1.6E+01	9.8E+02	<1	4.9E+03	<1
Mercury	5.2E+01	2.8E-01	2.4E-01	0.0E+00	5.2E-01	3.2E-01	8.4E-01	4.5E-01	**1.9**	9.1E-01	<1
Nickel	1.2E+02	3.6E-01	7.7E+00	0.0E+00	8.1E+00	7.6E-01	8.9E+00	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+02	1.9E+01	3.0E+00	0.0E+00	2.2E+01	1.5E+00	2.3E+01	4.0E-01	**58.4**	8.0E-01	**29.2**
Silver	1.0E+02	3.6E+00	1.2E+01	0.0E+00	1.6E+01	6.2E-01	1.6E+01	1.5E+01	**1.1**	4.4E+01	<1
Thallium	7.2E+00	2.6E-03	4.3E-01	0.0E+00	4.3E-01	4.5E-02	4.8E-01	NA	--	NA	--
Vanadium	1.5E+02	7.5E-02	3.8E-01	0.0E+00	4.6E-01	9.5E-01	1.4E+00	1.1E+01	<1	5.7E+01	<1
Zinc	1.3E+05	3.2E+02	2.5E+02	0.0E+00	5.7E+02	8.1E+02	1.4E+03	1.5E+01	**95.0**	1.3E+02	**10.5**
Organics											
DDT	2.4E+00	3.0E-02	1.1E+00	0.0E+00	1.1E+00	1.5E-02	1.1E+00	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.1E-01	2.4E-02	1.2E-01	0.0E+00	1.4E-01	3.2E-03	1.5E-01	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	5.8E+01	5.2E+00	3.5E+00	0.0E+00	8.7E+00	3.6E-01	9.1E+00	5.2E-01	**17.4**	6.8E-01	**13.3**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-51
MEAN EXPOSURE ESTIMATE - AMERICAN ROBIN
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	4.7E-01	1.1E+01	0.0E+00	1.2E+01	1.2E+00	1.3E+01	NA	--	NA	--
Arsenic	1.8E+03	8.1E-01	2.7E+00	0.0E+00	3.5E+00	1.1E+01	1.5E+01	5.5E+00	**2.7**	2.2E+01	<1
Barium	1.7E+03	2.3E+01	9.2E+00	0.0E+00	3.2E+01	1.1E+01	4.3E+01	2.1E+02	<1	4.2E+02	<1
Cadmium	1.6E+02	9.2E-01	2.8E+01	0.0E+00	2.9E+01	1.0E+00	3.0E+01	1.9E+00	**15.8**	2.1E+01	**1.4**
Chromium	5.9E+01	4.0E-02	1.1E+00	0.0E+00	1.1E+00	3.7E-01	1.5E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	6.8E+00	1.2E-02	5.0E-02	0.0E+00	6.2E-02	4.2E-02	1.0E-01	7.6E+00	<1	3.8E+01	<1
Copper	5.8E+02	2.1E+00	1.7E+00	0.0E+00	3.8E+00	3.6E+00	7.4E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.9E+04	5.9E+00	1.4E+02	0.0E+00	1.5E+02	1.2E+02	2.7E+02	7.4E+00	**35.9**	3.7E+01	**7.2**
Manganese	2.4E+02	5.5E+00	1.1E+00	0.0E+00	6.6E+00	1.5E+00	8.1E+00	9.8E+02	<1	4.9E+03	<1
Mercury	9.6E+00	1.1E-01	1.4E-01	0.0E+00	2.5E-01	6.0E-02	3.1E-01	4.5E-01	<1	9.1E-01	<1
Nickel	2.5E+01	1.1E-01	1.6E+00	0.0E+00	1.7E+00	1.5E-01	1.8E+00	8.0E+01	<1	1.1E+02	<1
Selenium	1.1E+01	6.2E-01	3.1E-01	0.0E+00	9.3E-01	6.7E-02	1.0E+00	4.0E-01	**2.5**	8.0E-01	**1.2**
Silver	1.4E+01	5.0E-01	1.7E+00	0.0E+00	2.2E+00	8.6E-02	2.3E+00	1.5E+01	<1	4.4E+01	<1
Thallium	1.5E+00	5.5E-04	9.1E-02	0.0E+00	9.2E-02	9.5E-03	1.0E-01	NA	--	NA	--
Vanadium	2.7E+01	1.3E-02	6.9E-02	0.0E+00	8.2E-02	1.7E-01	2.5E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	1.1E+02	1.3E+02	0.0E+00	2.4E+02	1.1E+02	3.5E+02	1.5E+01	**24.0**	1.3E+02	**2.7**
Organics											
DDT	3.3E-01	4.1E-03	1.9E-01	0.0E+00	2.0E-01	2.1E-03	2.0E-01	3.0E+00	<1	1.5E+01	<1
Methoxychlor	9.3E-02	4.4E-03	2.1E-02	0.0E+00	2.6E-02	5.8E-04	2.6E-02	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	1.8E+01	1.6E+00	1.1E+00	0.0E+00	2.7E+00	1.1E-01	2.8E+00	5.2E-01	**5.4**	6.8E-01	**4.2**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-52
MAXIMUM EXPOSURE ESTIMATE - RED-TAILED HAWK
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	0.0E+00	0.0E+00	1.2E-01	1.2E-01	0.0E+00	1.2E-01	NA	--	NA	--
Arsenic	9.9E+04	0.0E+00	0.0E+00	7.7E+00	7.7E+00	0.0E+00	7.7E+00	5.5E+00	**1.4**	2.2E+01	<1
Barium	1.4E+04	0.0E+00	0.0E+00	6.3E+01	6.3E+01	0.0E+00	6.3E+01	2.1E+02	<1	4.2E+02	<1
Cadmium	5.9E+03	0.0E+00	0.0E+00	2.3E+00	2.3E+00	0.0E+00	2.3E+00	1.9E+00	**1.2**	2.1E+01	<1
Chromium	9.0E+02	0.0E+00	0.0E+00	2.7E+00	2.7E+00	0.0E+00	2.7E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	2.3E+01	0.0E+00	0.0E+00	3.7E-02	3.7E-02	0.0E+00	3.7E-02	7.6E+00	<1	3.8E+01	<1
Copper	5.1E+03	0.0E+00	0.0E+00	3.0E+00	3.0E+00	0.0E+00	3.0E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.5E+05	0.0E+00	0.0E+00	2.1E+01	2.1E+01	0.0E+00	2.1E+01	7.4E+00	**2.8**	3.7E+01	<1
Manganese	4.9E+02	0.0E+00	0.0E+00	3.9E-03	3.9E-03	0.0E+00	3.9E-03	9.8E+02	<1	4.9E+03	<1
Mercury	5.2E+01	0.0E+00	0.0E+00	2.2E-01	2.2E-01	0.0E+00	2.2E-01	4.5E-01	<1	9.1E-01	<1
Nickel	1.2E+02	0.0E+00	0.0E+00	5.8E-01	5.8E-01	0.0E+00	5.8E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+02	0.0E+00	0.0E+00	4.1E-01	4.1E-01	0.0E+00	4.1E-01	4.0E-01	**1.0**	8.0E-01	<1
Silver	1.0E+02	0.0E+00	0.0E+00	9.5E-03	9.5E-03	0.0E+00	9.5E-03	1.5E+01	<1	4.4E+01	<1
Thallium	7.2E+00	0.0E+00	0.0E+00	6.4E-02	6.4E-02	0.0E+00	6.4E-02	NA	--	NA	--
Vanadium	1.5E+02	0.0E+00	0.0E+00	1.7E-04	1.7E-04	0.0E+00	1.7E-04	1.1E+01	<1	5.7E+01	<1
Zinc	1.3E+05	0.0E+00	0.0E+00	1.7E+01	1.7E+01	0.0E+00	1.7E+01	1.5E+01	**1.1**	1.3E+02	<1
Organics											
DDT	2.4E+00	0.0E+00	0.0E+00	2.1E+00	2.1E+00	0.0E+00	2.1E+00	3.0E+00	<1	1.5E+01	<1
Methoxychlor	5.1E-01	0.0E+00	0.0E+00	5.7E-03	5.7E-03	0.0E+00	5.7E-03	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	5.8E+01	0.0E+00	0.0E+00	4.6E+00	4.6E+00	0.0E+00	4.6E+00	5.2E-01	**8.9**	6.8E-01	**6.8**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-53
MEAN EXPOSURE ESTIMATE - RED-TAILED HAWK
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	0.0E+00	0.0E+00	3.0E-03	3.0E-03	0.0E+00	3.0E-03	NA	--	NA	--
Arsenic	1.8E+03	0.0E+00	0.0E+00	2.9E-01	2.9E-01	0.0E+00	2.9E-01	5.5E+00	<1	2.2E+01	<1
Barium	1.7E+03	0.0E+00	0.0E+00	7.6E+00	7.6E+00	0.0E+00	7.6E+00	2.1E+02	<1	4.2E+02	<1
Cadmium	1.6E+02	0.0E+00	0.0E+00	3.1E-01	3.1E-01	0.0E+00	3.1E-01	1.9E+00	<1	2.1E+01	<1
Chromium	5.9E+01	0.0E+00	0.0E+00	3.7E-01	3.7E-01	0.0E+00	3.7E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	6.8E+00	0.0E+00	0.0E+00	1.1E-02	1.1E-02	0.0E+00	1.1E-02	7.6E+00	<1	3.8E+01	<1
Copper	5.8E+02	0.0E+00	0.0E+00	2.0E+00	2.0E+00	0.0E+00	2.0E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.9E+04	0.0E+00	0.0E+00	7.1E+00	7.1E+00	0.0E+00	7.1E+00	7.4E+00	<1	3.7E+01	<1
Manganese	2.4E+02	0.0E+00	0.0E+00	1.9E-03	1.9E-03	0.0E+00	1.9E-03	9.8E+02	<1	4.9E+03	<1
Mercury	9.6E+00	0.0E+00	0.0E+00	4.1E-02	4.1E-02	0.0E+00	4.1E-02	4.5E-01	<1	9.1E-01	<1
Nickel	2.5E+01	0.0E+00	0.0E+00	2.8E-01	2.8E-01	0.0E+00	2.8E-01	8.0E+01	<1	1.1E+02	<1
Selenium	1.1E+01	0.0E+00	0.0E+00	1.3E-01	1.3E-01	0.0E+00	1.3E-01	4.0E-01	<1	8.0E-01	<1
Silver	1.4E+01	0.0E+00	0.0E+00	1.3E-03	1.3E-03	0.0E+00	1.3E-03	1.5E+01	<1	4.4E+01	<1
Thallium	1.5E+00	0.0E+00	0.0E+00	1.4E-02	1.4E-02	0.0E+00	1.4E-02	NA	--	NA	--
Vanadium	2.7E+01	0.0E+00	0.0E+00	3.0E-05	3 0E-05	0.0E+00	3.0E-05	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	0.0E+00	0.0E+00	1.4E+01	1.4E+01	0.0E+00	1.4E+01	1.5E+01	<1	1.3E+02	<1
Organics											
DDT	3.3E-01	0.0E+00	0.0E+00	6.0E-01	6.0E-01	0.0E+00	6.0E-01	3.0E+00	<1	1.5E+01	<1
Methoxychlor	9.3E-02	0.0E+00	0.0E+00	1.0E-03	1.0E-03	0.0E+00	1.0E-03	1.5E+02	<1	7.3E+02	<1
Other											
Cyanide	1.8E+01	0.0E+00	0.0E+00	1.4E+00	1.4E+00	0.0E+00	1.4E+00	5.2E-01	**2.8**	6.8E-01	**2.1**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-54
MAXIMUM EXPOSURE ESTIMATE - GROUNDHOG
REDEVELOPMENT AREA (0-3 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	8.4E+00	0.0E+00	0.0E+00	8.4E+00	7.5E+00	1.6E+01	1.3E+01	**1.2**	6.7E+01	<1
Arsenic	9.9E+04	4.4E+00	0.0E+00	0.0E+00	4.4E+00	1.0E+02	1.1E+02	5.7E+00	**18.5**	1.2E+01	**9.1**
Barium	1.4E+04	1.1E+02	0.0E+00	0.0E+00	1.1E+02	1.4E+01	1.2E+02	5.2E+01	**2.3**	2.6E+02	<1
Cadmium	5.9E+03	3.7E+00	0.0E+00	0.0E+00	3.7E+00	6.0E+00	9.8E+00	5.1E+00	**1.9**	7.1E+00	**1.4**
Chromium	9.0E+02	3.4E-01	0.0E+00	0.0E+00	3.4E-01	9.1E-01	1.3E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	2.3E+01	2.3E-02	0.0E+00	0.0E+00	2.3E-02	2.3E-02	4.6E-02	7.3E+00	<1	3.7E+01	<1
Copper	5.1E+03	2.8E+00	0.0E+00	0.0E+00	2.8E+00	5.2E+00	8.0E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.5E+05	1.1E+01	0.0E+00	0.0E+00	1.1E+01	1.5E+02	1.6E+02	3.4E+01	**4.7**	8.0E+01	**2.0**
Manganese	4.9E+02	6.2E+00	0.0E+00	0.0E+00	6.2E+00	4.9E-01	6.7E+00	8.8E+01	<1	2.8E+02	<1
Mercury	5.2E+01	1.6E-01	0.0E+00	0.0E+00	1.6E-01	5.3E-02	2.1E-01	1.3E+01	<1	5.6E+01	<1
Nickel	1.2E+02	2.0E-01	0.0E+00	0.0E+00	2.0E-01	1.2E-01	3.3E-01	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+02	1.1E+01	0.0E+00	0.0E+00	1.1E+01	2.4E-01	1.1E+01	3.5E-01	**31.1**	1.1E+00	**10.4**
Silver	1.0E+02	2.0E+00	0.0E+00	0.0E+00	2.0E+00	1.0E-01	2.1E+00	4.4E+01	<1	2.2E+02	<1
Thallium	7.2E+00	1.5E-03	0.0E+00	0.0E+00	1.5E-03	7.3E-03	8.8E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	1.5E+02	4.2E-02	0.0E+00	0.0E+00	4.2E-02	1.5E-01	2.0E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.3E+05	1.8E+02	0.0E+00	0.0E+00	1.8E+02	1.3E+02	3.1E+02	1.6E+02	**2.0**	3.2E+02	<1
Organics											
DDT	2.4E+00	1.7E-02	0.0E+00	0.0E+00	1.7E-02	2.5E-03	1.9E-02	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.1E-01	1.4E-02	0.0E+00	0.0E+00	1.4E-02	5.2E-04	1.4E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	5.8E+01	2.9E+00	0.0E+00	0.0E+00	2.9E+00	5.9E-02	3.0E+00	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-55
MEAN EXPOSURE ESTIMATE - GROUNDHOG
REDEVELOPMENT AREA (0-3 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	2.7E-01	0.0E+00	0.0E+00	2.7E-01	1.9E-01	4.6E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.8E+03	4.6E-01	0.0E+00	0.0E+00	4.6E-01	1.8E+00	2.3E+00	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+03	1.3E+01	0.0E+00	0.0E+00	1.3E+01	1.7E+00	1.5E+01	5.2E+01	<1	2.6E+02	<1
Cadmium	1.6E+02	5.2E-01	0.0E+00	0.0E+00	5.2E-01	1.7E-01	6.8E-01	5.1E+00	<1	7.1E+00	<1
Chromium	5.9E+01	2.2E-02	0.0E+00	0.0E+00	2.2E-02	6.0E-02	8.2E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	6.8E+00	6.9E-03	0.0E+00	0.0E+00	6.9E-03	6.9E-03	1.4E-02	7.3E+00	<1	3.7E+01	<1
Copper	5.8E+02	1.2E+00	0.0E+00	0.0E+00	1.2E+00	5.9E-01	1.8E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.9E+04	3.3E+00	0.0E+00	0.0E+00	3.3E+00	1.9E+01	2.3E+01	3.4E+01	<1	8.0E+01	<1
Manganese	2.4E+02	3.1E+00	0.0E+00	0.0E+00	3.1E+00	2.5E-01	3.3E+00	8.8E+01	<1	2.8E+02	<1
Mercury	9.6E+00	6.3E-02	0.0E+00	0.0E+00	6.3E-02	9.7E-03	7.3E-02	1.3E+01	<1	5.6E+01	<1
Nickel	2.5E+01	6.1E-02	0.0E+00	0.0E+00	6.1E-02	2.5E-02	8.6E-02	6.0E+01	<1	8.0E+01	<1
Selenium	1.1E+01	3.5E-01	0.0E+00	0.0E+00	3.5E-01	1.1E-02	3.6E-01	3.5E-01	**1.0**	1.1E+00	<1
Silver	1.4E+01	2.8E-01	0.0E+00	0.0E+00	2.8E-01	1.4E-02	2.9E-01	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E+00	3.1E-04	0.0E+00	0.0E+00	3.1E-04	1.5E-03	1.9E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	2.7E+01	7.6E-03	0.0E+00	0.0E+00	7.6E-03	2.8E-02	3.5E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	6.0E+01	0.0E+00	0.0E+00	6.0E+01	1.8E+01	7.8E+01	1.6E+02	<1	3.2E+02	<1
Organics											
DDT	3.3E-01	2.3E-03	0.0E+00	0.0E+00	2.3E-03	3.4E-04	2.6E-03	4.5E+00	<1	2.3E+01	<1
Methoxychlor	9.3E-02	2.5E-03	0.0E+00	0.0E+00	2.5E-03	9.4E-05	2.6E-03	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	1.8E+01	9.2E-01	0.0E+00	0.0E+00	9.2E-01	1.8E-02	9.4E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-56
MAXIMUM EXPOSURE ESTIMATE - WHITE-TAILED DEER
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	2.4E+00	0.0E+00	0.0E+00	2.4E+00	2.2E+00	4.6E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	9.9E+04	1.3E+00	0.0E+00	0.0E+00	1.3E+00	2.9E+01	3.0E+01	5.7E+00	**5.3**	1.2E+01	**2.6**
Barium	1.4E+04	3.1E+01	0.0E+00	0.0E+00	3.1E+01	4.1E+00	3.5E+01	5.2E+01	<1	2.6E+02	<1
Cadmium	5.9E+03	1.1E+00	0.0E+00	0.0E+00	1.1E+00	1.7E+00	2.8E+00	5.1E+00	<1	7.1E+00	<1
Chromium	9.0E+02	9.8E-02	0.0E+00	0.0E+00	9.8E-02	2.6E-01	3.6E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	2.3E+01	6.6E-03	0.0E+00	0.0E+00	6.6E-03	6.6E-03	1.3E-02	7.3E+00	<1	3.7E+01	<1
Copper	5.1E+03	8.0E-01	0.0E+00	0.0E+00	8.0E-01	1.5E+00	2.3E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.5E+05	3.0E+00	0.0E+00	0.0E+00	3.0E+00	4.3E+01	4.6E+01	3.4E+01	**1.4**	8.0E+01	<1
Manganese	4.9E+02	1.8E+00	0.0E+00	0.0E+00	1.8E+00	1.4E-01	1.9E+00	8.8E+01	<1	2.8E+02	<1
Mercury	5.2E+01	4.6E-02	0.0E+00	0.0E+00	4.6E-02	1.5E-02	6.1E-02	1.3E+01	<1	5.6E+01	<1
Nickel	1.2E+02	5.8E-02	0.0E+00	0.0E+00	5.8E-02	3.6E-02	9.4E-02	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+02	3.1E+00	0.0E+00	0.0E+00	3.1E+00	7.0E-02	3.1E+00	3.5E-01	**9.0**	1.1E+00	**3.0**
Silver	1.0E+02	5.9E-01	0.0E+00	0.0E+00	5.9E-01	2.9E-02	6.2E-01	4.4E+01	<1	2.2E+02	<1
Thallium	7.2E+00	4.2E-04	0.0E+00	0.0E+00	4.2E-04	2.1E-03	2.5E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	1.5E+02	1.2E-02	0.0E+00	0.0E+00	1.2E-02	4.5E-02	5.7E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.3E+05	5.2E+01	0.0E+00	0.0E+00	5.2E+01	3.8E+01	9.0E+01	1.6E+02	<1	3.2E+02	<1
Organics											
DDT	2.4E+00	4.8E-03	0.0E+00	0.0E+00	4.8E-03	7.1E-04	5.5E-03	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.1E-01	3.9E-03	0.0E+00	0.0E+00	3.9E-03	1.5E-04	4.1E-03	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	5.8E+01	8.5E-01	0.0E+00	0.0E+00	8.5E-01	1.7E-02	8.7E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-57
MEAN EXPOSURE ESTIMATE - WHITE-TAILED DEER
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	7.7E-02	0.0E+00	0.0E+00	7.7E-02	5.4E-02	1.3E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.8E+03	1.3E-01	0.0E+00	0.0E+00	1.3E-01	5.2E-01	6.5E-01	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+03	3.7E+00	0.0E+00	0.0E+00	3.7E+00	5.0E-01	4.2E+00	5.2E+01	<1	2.6E+02	<1
Cadmium	1.6E+02	1.5E-01	0.0E+00	0.0E+00	1.5E-01	4.8E-02	2.0E-01	5.1E+00	<1	7.1E+00	<1
Chromium	5.9E+01	6.4E-03	0.0E+00	0.0E+00	6.4E-03	1.7E-02	2.4E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	6.8E+00	2.0E-03	0.0E+00	0.0E+00	2.0E-03	2.0E-03	4.0E-03	7.3E+00	<1	3.7E+01	<1
Copper	5.8E+02	3.4E-01	0.0E+00	0.0E+00	3.4E-01	1.7E-01	5.1E-01	1.2E+01	<1	1.5E+01	<1
Lead	1.9E+04	9.6E-01	0.0E+00	0.0E+00	9.6E-01	5.6E+00	6.5E+00	3.4E+01	<1	8.0E+01	<1
Manganese	2.4E+02	8.9E-01	0.0E+00	0.0E+00	8.9E-01	7.2E-02	9.7E-01	8.8E+01	<1	2.8E+02	<1
Mercury	9.6E+00	1.8E-02	0.0E+00	0.0E+00	1.8E-02	2.8E-03	2.1E-02	1.3E+01	<1	5.6E+01	<1
Nickel	2.5E+01	1.8E-02	0.0E+00	0.0E+00	1.8E-02	7.2E-03	2.5E-02	6.0E+01	<1	8.0E+01	<1
Selenium	1.1E+01	1.0E-01	0.0E+00	0.0E+00	1.0E-01	3.1E-03	1.0E-01	3.5E-01	<1	1.1E+00	<1
Silver	1.4E+01	8.1E-02	0.0E+00	0.0E+00	8.1E-02	4.1E-03	8.5E-02	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E+00	8.9E-05	0.0E+00	0.0E+00	8.9E-05	4.5E-04	5.4E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	2.7E+01	2.2E-03	0.0E+00	0.0E+00	2.2E-03	8.0E-03	1.0E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	1.7E+01	0.0E+00	0.0E+00	1.7E+01	5.3E+00	2.3E+01	1.6E+02	<1	3.2E+02	<1
Organics											
DDT	3.3E-01	6.6E-04	0.0E+00	0.0E+00	6.6E-04	9.8E-05	7.6E-04	4.5E+00	<1	2.3E+01	<1
Methoxychlor	9.3E-02	7.2E-04	0.0E+00	0.0E+00	7.2E-04	2.7E-05	7.4E-04	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	1.8E+01	2.7E-01	0.0E+00	0.0E+00	2.7E-01	5.3E-03	2.7E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-58
MAXIMUM EXPOSURE ESTIMATE - DEER MOUSE
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	1.9E+01	8.2E+02	0.0E+00	8.4E+02	4.0E+01	8.8E+02	1.3E+01	**66.4**	6.7E+01	**13.3**
Arsenic	9.9E+04	9.6E+00	8.5E+01	0.0E+00	9.5E+01	5.3E+02	6.3E+02	5.7E+00	**110.5**	1.2E+01	**54.3**
Barium	1.4E+04	2.3E+02	1.4E+02	0.0E+00	3.8E+02	7.5E+01	4.5E+02	5.2E+01	**8.7**	2.6E+02	**1.7**
Cadmium	5.9E+03	8.2E+00	5.6E+02	0.0E+00	5.7E+02	3.2E+01	6.0E+02	5.1E+00	**118.0**	7.1E+00	**84.8**
Chromium	9.0E+02	7.5E-01	3.1E+01	0.0E+00	3.1E+01	4.8E+00	3.6E+01	7.4E+00	**4.9**	3.7E+01	<1
Cobalt	2.3E+01	5.1E-02	3.1E-01	0.0E+00	3.6E-01	1.2E-01	4.8E-01	7.3E+00	<1	3.7E+01	<1
Copper	5.1E+03	6.1E+00	5.7E+00	0.0E+00	1.2E+01	2.7E+01	3.9E+01	1.2E+01	**3.4**	1.5E+01	**2.6**
Lead	1.5E+05	2.3E+01	1.4E+03	0.0E+00	1.4E+03	7.9E+02	2.2E+03	3.4E+01	**64.9**	8.0E+01	**27.6**
Manganese	4.9E+02	1.4E+01	3.4E+00	0.0E+00	1.7E+01	2.6E+00	2.0E+01	8.8E+01	<1	2.8E+02	<1
Mercury	5.2E+01	3.5E-01	4.5E-01	0.0E+00	8.0E-01	2.8E-01	1.1E+00	1.3E+01	<1	5.6E+01	<1
Nickel	1.2E+02	4.5E-01	1.4E+01	0.0E+00	1.5E+01	6.6E-01	1.6E+01	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+02	2.3E+01	5.7E+00	0.0E+00	2.9E+01	1.3E+00	3.0E+01	3.5E-01	**86.9**	1.1E+00	**29.0**
Silver	1.0E+02	4.5E+00	2.3E+01	0.0E+00	2.7E+01	5.4E-01	2.8E+01	4.4E+01	<1	2.2E+02	<1
Thallium	7.2E+00	3.2E-03	8.1E-01	0.0E+00	8.1E-01	3.9E-02	8.5E-01	2.0E-01	**4.2**	1.0E+00	<1
Vanadium	1.5E+02	9.4E-02	7.2E-01	0.0E+00	8.1E-01	8.2E-01	1.6E+00	5.9E+00	<1	8.3E+00	<1
Zinc	1.3E+05	4.0E+02	4.6E+02	0.0E+00	8.6E+02	7.0E+02	1.6E+03	1.6E+02	**9.7**	3.2E+02	**4.9**
Organics											
DDT	2.4E+00	3.7E-02	2.0E+00	0.0E+00	2.1E+00	1.3E-02	2.1E+00	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.1E-01	3.0E-02	2.2E-01	0.0E+00	2.5E-01	2.8E-03	2.5E-01	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	5.8E+01	6.5E+00	6.5E+00	0.0E+00	1.3E+01	3.1E-01	1.3E+01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-59
MEAN EXPOSURE ESTIMATE - DEER MOUSE
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	5.9E-01	2.1E+01	0.0E+00	2.1E+01	1.0E+00	2.2E+01	1.3E+01	**1.7**	6.7E+01	<1
Arsenic	1.8E+03	1.0E+00	5.1E+00	0.0E+00	6.1E+00	9.5E+00	1.6E+01	5.7E+00	**2.7**	1.2E+01	**1.3**
Barium	1.7E+03	2.8E+01	1.7E+01	0.0E+00	4.6E+01	9.1E+00	5.5E+01	5.2E+01	**1.1**	2.6E+02	<1
Cadmium	1.6E+02	1.1E+00	5.2E+01	0.0E+00	5.4E+01	8.8E-01	5.4E+01	5.1E+00	**10.7**	7.1E+00	**7.7**
Chromium	5.9E+01	4.9E-02	2.0E+00	0.0E+00	2.1E+00	3.2E-01	2.4E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	6.8E+00	1.5E-02	9.3E-02	0.0E+00	1.1E-01	3.7E-02	1.4E-01	7.3E+00	<1	3.7E+01	<1
Copper	5.8E+02	2.6E+00	3.2E+00	0.0E+00	5.8E+00	3.1E+00	8.9E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.9E+04	7.4E+00	2.6E+02	0.0E+00	2.7E+02	1.0E+02	3.7E+02	3.4E+01	**11.0**	8.0E+01	**4.7**
Manganese	2.4E+02	6.8E+00	2.1E+00	0.0E+00	8.9E+00	1.3E+00	1.0E+01	8.8E+01	<1	2.8E+02	<1
Mercury	9.6E+00	1.4E-01	2.6E-01	0.0E+00	3.9E-01	5.1E-02	4.5E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.5E+01	1.3E-01	2.9E+00	0.0E+00	3.0E+00	1.3E-01	3.2E+00	6.0E+01	<1	8.0E+01	<1
Selenium	1.1E+01	7.7E-01	5.9E-01	0.0E+00	1.4E+00	5.8E-02	1.4E+00	3.5E-01	**4.0**	1.1E+00	**1.3**
Silver	1.4E+01	6.2E-01	3.2E+00	0.0E+00	3.8E+00	7.4E-02	3.9E+00	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E+00	6.8E-04	1.7E-01	0.0E+00	1.7E-01	8.2E-03	1.8E-01	2.0E-01	<1	1.0E+00	<1
Vanadium	2.7E+01	1.7E-02	1.3E-01	0.0E+00	1.5E-01	1.5E-01	2.9E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	1.3E+02	2.4E+02	0.0E+00	3.7E+02	9.7E+01	4.7E+02	1.6E+02	**2.9**	3.2E+02	**1.5**
Organics											
DDT	3.3E-01	5.1E-03	3.6E-01	0.0E+00	3.7E-01	1.8E-03	3.7E-01	4.5E+00	<1	2.3E+01	<1
Methoxychlor	9.3E-02	5.5E-03	4.0E-02	0.0E+00	4.6E-02	5.0E-04	4.6E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	1.8E+01	2.0E+00	2.0E+00	0.0E+00	4.1E+00	9.7E-02	4.1E+00	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-60
MAXIMUM EXPOSURE ESTIMATE - SHORT-TAILED SHREW
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	0.0E+00	9.9E+02	0.0E+00	9.9E+02	1.3E+02	1.1E+03	1.3E+01	**83.8**	6.7E+01	**16.8**
Arsenic	9.9E+04	0.0E+00	1.0E+02	0.0E+00	1.0E+02	1.7E+03	1.8E+03	5.7E+00	**321.7**	1.2E+01	**158.1**
Barium	1.4E+04	0.0E+00	1.7E+02	0.0E+00	1.7E+02	2.4E+02	4.1E+02	5.2E+01	**7.9**	2.6E+02	**1.6**
Cadmium	5.9E+03	0.0E+00	6.7E+02	0.0E+00	6.7E+02	1.0E+02	7.8E+02	5.1E+00	**152.0**	7.1E+00	**109.2**
Chromium	9.0E+02	0.0E+00	3.7E+01	0.0E+00	3.7E+01	1.6E+01	5.2E+01	7.4E+00	**7.1**	3.7E+01	**1.4**
Cobalt	2.3E+01	0.0E+00	3.7E-01	0.0E+00	3.7E-01	3.9E-01	7.6E-01	7.3E+00	<1	3.7E+01	<1
Copper	5.1E+03	0.0E+00	6.8E+00	0.0E+00	6.8E+00	8.9E+01	9.6E+01	1.2E+01	**8.2**	1.5E+01	**6.3**
Lead	1.5E+05	0.0E+00	1.7E+03	0.0E+00	1.7E+03	2.6E+03	4.2E+03	3.4E+01	**124.3**	8.0E+01	**52.8**
Manganese	4.9E+02	0.0E+00	4.0E+00	0.0E+00	4.0E+00	8.4E+00	1.2E+01	8.8E+01	<1	2.8E+02	<1
Mercury	5.2E+01	0.0E+00	5.3E-01	0.0E+00	5.3E-01	9.1E-01	1.4E+00	1.3E+01	<1	5.6E+01	<1
Nickel	1.2E+02	0.0E+00	1.7E+01	0.0E+00	1.7E+01	2.1E+00	1.9E+01	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+02	0.0E+00	6.8E+00	0.0E+00	6.8E+00	4.2E+00	1.1E+01	3.5E-01	**31.2**	1.1E+00	**10.4**
Silver	1.0E+02	0.0E+00	2.7E+01	0.0E+00	2.7E+01	1.7E+00	2.9E+01	4.4E+01	<1	2.2E+02	<1
Thallium	7.2E+00	0.0E+00	9.7E-01	0.0E+00	9.7E-01	1.3E-01	1.1E+00	2.0E-01	**5.5**	1.0E+00	**1.1**
Vanadium	1.5E+02	0.0E+00	8.6E-01	0.0E+00	8.6E-01	2.6E+00	3.5E+00	5.9E+00	<1	8.3E+00	<1
Zinc	1.3E+05	0.0E+00	5.5E+02	0.0E+00	5.5E+02	2.3E+03	2.8E+03	1.6E+02	**17.6**	3.2E+02	**8.8**
Organics											
DDT	2.4E+00	0.0E+00	2.4E+00	0.0E+00	2.4E+00	4.2E-02	2.5E+00	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.1E-01	0.0E+00	2.6E-01	0.0E+00	2.6E-01	8.9E-03	2.7E-01	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	5.8E+01	0.0E+00	7.8E+00	0.0E+00	7.8E+00	1.0E+00	8.8E+00	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-61
MEAN EXPOSURE ESTIMATE - SHORT-TAILED SHREW
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	0.0E+00	2.5E+01	0.0E+00	2.5E+01	3.2E+00	2.8E+01	1.3E+01	**2.1**	6.7E+01	<1
Arsenic	1.8E+03	0.0E+00	6.1E+00	0.0E+00	6.1E+00	3.1E+01	3.7E+01	5.7E+00	**6.5**	1.2E+01	**3.2**
Barium	1.7E+03	0.0E+00	2.1E+01	0.0E+00	2.1E+01	2.9E+01	5.0E+01	5.2E+01	<1	2.6E+02	<1
Cadmium	1.6E+02	0.0E+00	6.3E+01	0.0E+00	6.3E+01	2.8E+00	6.6E+01	5.1E+00	**12.8**	7.1E+00	**9.2**
Chromium	5.9E+01	0.0E+00	2.4E+00	0.0E+00	2.4E+00	1.0E+00	3.4E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	6.8E+00	0.0E+00	1.1E-01	0.0E+00	1.1E-01	1.2E-01	2.3E-01	7.3E+00	<1	3.7E+01	<1
Copper	5.8E+02	0.0E+00	3.8E+00	0.0E+00	3.8E+00	1.0E+01	1.4E+01	1.2E+01	**1.2**	1.5E+01	<1
Lead	1.9E+04	0.0E+00	3.2E+02	0.0E+00	3.2E+02	3.3E+02	6.5E+02	3.4E+01	**19.0**	8.0E+01	**8.1**
Manganese	2.4E+02	0.0E+00	2.5E+00	0.0E+00	2.5E+00	4.3E+00	6.8E+00	8.8E+01	<1	2.8E+02	<1
Mercury	9.6E+00	0.0E+00	3.1E-01	0.0E+00	3.1E-01	1.7E-01	4.7E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.5E+01	0.0E+00	3.5E+00	0.0E+00	3.5E+00	4.3E-01	3.9E+00	6.0E+01	<1	8.0E+01	<1
Selenium	1.1E+01	0.0E+00	7.0E-01	0.0E+00	7.0E-01	1.9E-01	8.9E-01	3.5E-01	**2.5**	1.1E+00	<1
Silver	1.4E+01	0.0E+00	3.8E+00	0.0E+00	3.8E+00	2.4E-01	4.0E+00	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E+00	0.0E+00	2.0E-01	0.0E+00	2.0E-01	2.7E-02	2.3E-01	2.0E-01	**1.2**	1.0E+00	<1
Vanadium	2.7E+01	0.0E+00	1.5E-01	0.0E+00	1.5E-01	4.7E-01	6.3E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	0.0E+00	2.9E+02	0.0E+00	2.9E+02	3.2E+02	6.0E+02	1.6E+02	**3.8**	3.2E+02	**1.9**
Organics											
DDT	3.3E-01	0.0E+00	4.3E-01	0.0E+00	4.3E-01	5.8E-03	4.4E-01	4.5E+00	<1	2.3E+01	<1
Methoxychlor	9.3E-02	0.0E+00	4.8E-02	0.0E+00	4.8E-02	1.6E-03	5.0E-02	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	1.8E+01	0.0E+00	2.4E+00	0.0E+00	2.4E+00	3.1E-01	2.7E+00	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-62
MAXIMUM EXPOSURE ESTIMATE - RED FOX
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$ [d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	7.4E+03	5.4E-01	0.0E+00	4.3E-02	5.8E-01	6.7E+00	7.3E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	9.9E+04	2.8E-01	0.0E+00	2.8E+00	3.1E+00	9.0E+01	9.4E+01	5.7E+00	**16.4**	1.2E+01	**8.1**
Barium	1.4E+04	6.8E+00	0.0E+00	2.3E+01	3.0E+01	1.3E+01	4.2E+01	5.2E+01	<1	2.6E+02	<1
Cadmium	5.9E+03	2.4E-01	0.0E+00	8.6E-01	1.1E+00	5.4E+00	6.5E+00	5.1E+00	**1.3**	7.1E+00	<1
Chromium	9.0E+02	2.2E-02	0.0E+00	1.0E+00	1.0E+00	8.1E-01	1.8E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	2.3E+01	1.5E-03	0.0E+00	1.4E-02	1.5E-02	2.1E-02	3.6E-02	7.3E+00	<1	3.7E+01	<1
Copper	5.1E+03	1.8E-01	0.0E+00	1.1E+00	1.3E+00	4.6E+00	5.9E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.5E+05	6.7E-01	0.0E+00	7.5E+00	8.2E+00	1.3E+02	1.4E+02	3.4E+01	**4.2**	8.0E+01	**1.8**
Manganese	4.9E+02	3.9E-01	0.0E+00	1.4E-03	4.0E-01	4.4E-01	8.4E-01	8.8E+01	<1	2.8E+02	<1
Mercury	5.2E+01	1.0E-02	0.0E+00	8.3E-02	9.3E-02	4.7E-02	1.4E-01	1.3E+01	<1	5.6E+01	<1
Nickel	1.2E+02	1.3E-02	0.0E+00	2.1E-01	2.3E-01	1.1E-01	3.4E-01	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+02	6.8E-01	0.0E+00	1.5E-01	8.3E-01	2.2E-01	1.0E+00	3.5E-01	**3.0**	1.1E+00	<1
Silver	1.0E+02	1.3E-01	0.0E+00	3.5E-03	1.3E-01	9.1E-02	2.2E-01	4.4E+01	<1	2.2E+02	<1
Thallium	7.2E+00	9.4E-05	0.0E+00	2.4E-02	2.4E-02	6.6E-03	3.0E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	1.5E+02	2.7E-03	0.0E+00	6.1E-05	2.8E-03	1.4E-01	1.4E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.3E+05	1.2E+01	0.0E+00	6.1E+00	1.8E+01	1.2E+02	1.4E+02	1.6E+02	<1	3.2E+02	<1
Organics											
DDT	2.4E+00	1.1E-03	0.0E+00	7.8E-01	7.8E-01	2.2E-03	7.8E-01	4.5E+00	<1	2.3E+01	<1
Methoxychlor	5.1E-01	8.7E-04	0.0E+00	2.1E-03	3.0E-03	4.7E-04	3.4E-03	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	5.8E+01	1.9E-01	0.0E+00	1.7E+00	1.9E+00	5.3E-02	1.9E+00	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-63
MEAN EXPOSURE ESTIMATE - RED FOX
REDEVELOPMENT AREA (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Analyte	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Metals											
Antimony	1.9E+02	1.7E-02	0.0E+00	1.1E-03	1.8E-02	1.7E-01	1.9E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.8E+03	2.9E-02	0.0E+00	1.0E-01	1.3E-01	1.6E+00	1.7E+00	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+03	8.3E-01	0.0E+00	2.8E+00	3.6E+00	1.5E+00	5.2E+00	5.2E+01	<1	2.6E+02	<1
Cadmium	1.6E+02	3.3E-02	0.0E+00	1.1E-01	1.5E-01	1.5E-01	2.9E-01	5.1E+00	<1	7.1E+00	<1
Chromium	5.9E+01	1.4E-03	0.0E+00	1.3E-01	1.4E-01	5.3E-02	1.9E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	6.8E+00	4.4E-04	0.0E+00	4.1E-03	4.5E-03	6.2E-03	1.1E-02	7.3E+00	<1	3.7E+01	<1
Copper	5.8E+02	7.6E-02	0.0E+00	7.5E-01	8.2E-01	5.3E-01	1.3E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.9E+04	2.1E-01	0.0E+00	2.6E+00	2.8E+00	1.7E+01	2.0E+01	3.4E+01	<1	8.0E+01	<1
Manganese	2.4E+02	2.0E-01	0.0E+00	7.1E-04	2.0E-01	2.2E-01	4.2E-01	8.8E+01	<1	2.8E+02	<1
Mercury	9.6E+00	4.0E-03	0.0E+00	1.5E-02	1.9E-02	8.7E-03	2.8E-02	1.3E+01	<1	5.6E+01	<1
Nickel	2.5E+01	3.9E-03	0.0E+00	1.0E-01	1.1E-01	2.2E-02	1.3E-01	6.0E+01	<1	8.0E+01	<1
Selenium	1.1E+01	2.2E-02	0.0E+00	4.7E-02	6.9E-02	9.7E-03	7.9E-02	3.5E-01	<1	1.1E+00	<1
Silver	1.4E+01	1.8E-02	0.0E+00	4.8E-04	1.8E-02	1.3E-02	3.1E-02	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E+00	2.0E-05	0.0E+00	5.0E-03	5.0E-03	1.4E-03	6.4E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	2.7E+01	4.9E-04	0.0E+00	1.1E-05	5.0E-04	2.5E-02	2.5E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	3.8E+00	0.0E+00	5.3E+00	9.1E+00	1.6E+01	2.6E+01	1.6E+02	<1	3.2E+02	<1
Organics											
DDT	3.3E-01	1.5E-04	0.0E+00	2.2E-01	2.2E-01	3.0E-04	2.2E-01	4.5E+00	<1	2.3E+01	<1
Methoxychlor	9.3E-02	1.6E-04	0.0E+00	3.8E-04	5.4E-04	8.5E-05	6.2E-04	4.0E+00	<1	8.0E+00	<1
Other											
Cyanide	1.8E+01	5.9E-02	0.0E+00	5.3E-01	5.9E-01	1.6E-02	6.0E-01	6.9E+01	<1	3.4E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-64
DIRECT EXPOSURE RISK ESTIMATES FOR PLANTS
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Parameter	Units	Plant Screening Values	Screening Value Source	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedences	Location of Detection Max	HQ
ANTIMONY	mg/kg	5	Efroymson et al. 1997	0.29	273	32.7	25	26	11	BERA-RNOF05-02	54.6
ARSENIC	mg/kg	18	Eco SSL	1.6	433	45.8	25	26	11	BERA-RNOF05-01	24.1
CADMIUM	mg/kg	32	Eco SSL	0.19	3660	167	26	26	6	BERA-RNOF05-01	114
CHROMIUM	mg/kg	1	Efroymson et al. 1997	2.42	42.3	12.5	25	26	25	BERA-RNOF05-01	42.3
COBALT	mg/kg	13	Eco SSL	0.47	50.8	5.87	12	13	1	BERA-RNOF05-01	3.91
COPPER	mg/kg	95	Eco SSL[a]	1.8	4470	259	26	26	8	BERA-RNOF05-01	47.1
LEAD	mg/kg	120	Eco SSL	5.49	124000	6001	26	26	21	BERA-RNOF05-01	1033
MANGANESE	mg/kg	152	Eco SSL[a]	8.51	5690	549	13	13	4	BERA-RNOF05-01	37.4
MERCURY	mg/kg	0.3	Efroymson et al. 1997[b]	0.0268	147	8.58	25	26	17	BERA-RNOF05-01	490
NICKEL	mg/kg	30	Efroymson et al. 1997	0.92	26.7	7.57	26	26	0	BERA-RNOF01-01	0.89
SELENIUM	mg/kg	1	Efroymson et al. 1997	0.61	86.3	7.28	21	26	17	BERA-RNOF05-01	86.3
SILVER	mg/kg	2	Efroymson et al. 1997	0.38	405	19.8	20	26	9	BERA-RNOF05-01	203
THALLIUM	mg/kg	1	Efroymson et al. 1997	0.0217	1.1	0.467	13	26	1	BERA-RNOF05-01	1.10
VANADIUM	mg/kg	2	Efroymson et al. 1997	3.12	29.8	9.23	12	13	12	BERA-RNOF05-01	14.9
ZINC	mg/kg	130	Eco SSL[a]	51.9	105000	6452	26	26	25	BERA-RNOF05-01	808

Data are for surface soil (0-1 feet).

a) Draft Eco SSL values - Kapustka et al. Issue Paper on the Ecological Effects of Metals August 19, 2004.

b) Inorganic forms

NT[1] = Not toxic as per USEPA Eco SSL document - http://www.epa.gov/ecotox/ecossl/

NT[2] = Not toxic; essential element

NT = Not tested

NA = Value not available

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TABLE F-65
DIRECT EXPOSURE RISK ESTIMATES FOR SOIL INVERTEBRATES
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Parameter	Units	Soil Invertebrate Screening Values	Screening Value Source	Minimum Detection	Maximum Detection	Mean Concentration	Number of Detections	Number of Samples	Number of Exceedences	Location of Detection Max	HQ
ANTIMONY	mg/kg	78	Eco SSL	0.29	273	32.7	25	26	3	BERA-RNOF05-02	3.5
ARSENIC	mg/kg	60	Efroymson et al. 1997	1.6	433	45.8	25	26	5	BERA-RNOF05-01	7.2
CADMIUM	mg/kg	140	Eco SSL	0.19	3660	167	26	26	2	BERA-RNOF05-01	26
CHROMIUM	mg/kg	0.4	Efroymson et al. 1997	2.42	42.3	12.5	25	26	26	BERA-RNOF05-01	106
COBALT	mg/kg	NA	NA	0.47	50.8	5.87	12	13	--	BERA-RNOF05-01	--
COPPER	mg/kg	54	Eco SSL[a]	1.8	4470	259	26	26	10	BERA-RNOF05-01	83
LEAD	mg/kg	1700	Eco SSL	5.49	124000	6001	26	26	5	BERA-RNOF05-01	73
MANGANESE	mg/kg	450	Eco SSL[a]	8.51	5690	549	13	13	1	BERA-RNOF05-01	13
MERCURY	mg/kg	0.1	Efroymson et al. 1997[b]	0.0268	147	8.58	25	26	22	BERA-RNOF05-01	1470
NICKEL	mg/kg	200	Efroymson et al. 1997	0.92	26.7	7.57	26	26	0	BERA-RNOF01-01	<1
SELENIUM	mg/kg	70	Efroymson et al. 1997	0.61	86.3	7.28	21	26	1	BERA-RNOF05-01	1.2
SILVER	mg/kg	NA	NA	0.38	405	19.8	20	26	--	BERA-RNOF05-01	--
THALLIUM	mg/kg	NA	NA	0.0217	1.1	0.467	13	26	--	BERA-RNOF05-01	--
VANADIUM	mg/kg	NA	NA	3.12	29.8	9.23	12	13	--	BERA-RNOF05-01	--
ZINC	mg/kg	120	Eco SSL[a]	51.9	105000	6452	26	26	25	BERA-RNOF05-01	875

Data are for surface soil (0-1 feet).

a) Draft Eco SSL values - Kapustka et al. Issue Paper on the Ecological Effects of Metals August 19, 2004.

b) Organic and inorganic forms

NT[1] = Not toxic as per USEPA Eco SSL document - http://www.epa.gov/ecotox/ecossl/

NT[2] = Not toxic; essential element

NT = Not tested

NA = Value not available

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TABLE F-66
MAXIMUM EXPOSURE ESTIMATE CANADA GOOSE
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$ [d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	2.4E-01	0.0E+00	0.0E+00	2.4E-01	7.1E-01	9.5E-01	NA	--	NA	--
Arsenic	4.3E+02	1.3E-01	0.0E+00	0.0E+00	1.3E-01	1.1E+00	1.3E+00	5.5E+00	<1	2.2E+01	<1
Barium	2.5E+02	1.2E+00	0.0E+00	0.0E+00	1.2E+00	6.5E-01	1.8E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	6.3E-04	0.0E+00	0.0E+00	6.3E-04	5.2E-03	5.8E-03	NA	--	NA	--
Cadmium	3.7E+03	1.8E+00	0.0E+00	0.0E+00	1.8E+00	9.5E+00	1.1E+01	1.9E+00	**6.0**	2.1E+01	<1
Chromium	4.2E+01	1.0E-02	0.0E+00	0.0E+00	1.0E-02	1.1E-01	1.2E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	3.2E-02	0.0E+00	0.0E+00	3.2E-02	1.3E-01	1.6E-01	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	1.6E+00	0.0E+00	0.0E+00	1.6E+00	1.2E+01	1.3E+01	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+05	6.0E+00	0.0E+00	0.0E+00	6.0E+00	3.2E+02	3.3E+02	7.4E+00	**44.4**	3.7E+01	**8.9**
Manganese	5.7E+03	4.5E+01	0.0E+00	0.0E+00	4.5E+01	1.5E+01	6.0E+01	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	1.7E-01	0.0E+00	0.0E+00	1.7E-01	3.8E-01	5.6E-01	4.5E-01	**1.2**	9.1E-01	<1
Nickel	2.7E+01	4.1E-02	0.0E+00	0.0E+00	4.1E-02	7.0E-02	1.1E-01	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	2.2E+00	0.0E+00	0.0E+00	2.2E+00	2.2E-01	2.4E+00	4.0E-01	**6.0**	8.0E-01	**3.0**
Silver	4.1E+02	5.1E+00	0.0E+00	0.0E+00	5.1E+00	1.1E+00	6.2E+00	1.5E+01	<1	4.4E+01	<1
Thallium	1.1E+00	1.4E-04	0.0E+00	0.0E+00	1.4E-04	2.9E-03	3.0E-03	NA	--	NA	--
Vanadium	3.0E+01	5.2E-03	0.0E+00	0.0E+00	5.2E-03	7.8E-02	8.3E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	1.0E+02	0.0E+00	0.0E+00	1.0E+02	2.7E+02	3.7E+02	1.5E+01	**25.8**	1.3E+02	**2.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-67
MEAN EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	3.3E-02	0.0E+00	0.0E+00	3.3E-02	8.5E-02	1.2E-01	NA	--	NA	--
Arsenic	4.6E+01	3.7E-02	0.0E+00	0.0E+00	3.7E-02	1.2E-01	1.6E-01	5.5E+00	<1	2.2E+01	<1
Barium	7.9E+01	3.8E-01	0.0E+00	0.0E+00	3.8E-01	2.1E-01	5.9E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	3.6E-01	1.2E-04	0.0E+00	0.0E+00	1.2E-04	9.5E-04	1.1E-03	NA	--	NA	--
Cadmium	1.7E+02	3.3E-01	0.0E+00	0.0E+00	3.3E-01	4.4E-01	7.6E-01	1.9E+00	<1	2.1E+01	<1
Chromium	1.3E+01	3.0E-03	0.0E+00	0.0E+00	3.0E-03	3.3E-02	3.6E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	5.9E+00	3.7E-03	0.0E+00	0.0E+00	3.7E-03	1.5E-02	1.9E-02	7.6E+00	<1	3.8E+01	<1
Copper	2.6E+02	5.4E-01	0.0E+00	0.0E+00	5.4E-01	6.7E-01	1.2E+00	3.3E+01	<1	6.2E+01	<1
Lead	6.0E+03	1.1E+00	0.0E+00	0.0E+00	1.1E+00	1.6E+01	1.7E+01	7.4E+00	**2.3**	3.7E+01	<1
Manganese	5.5E+02	4.4E+00	0.0E+00	0.0E+00	4.4E+00	1.4E+00	5.8E+00	9.8E+02	<1	4.9E+03	<1
Mercury	8.6E+00	3.7E-02	0.0E+00	0.0E+00	3.7E-02	2.2E-02	6.0E-02	4.5E-01	<1	9.1E-01	<1
Nickel	7.6E+00	1.6E-02	0.0E+00	0.0E+00	1.6E-02	2.0E-02	3.5E-02	8.0E+01	<1	1.1E+02	<1
Selenium	7.3E+00	1.4E-01	0.0E+00	0.0E+00	1.4E-01	1.9E-02	1.6E-01	4.0E-01	<1	8.0E-01	<1
Silver	2.0E+01	2.5E-01	0.0E+00	0.0E+00	2.5E-01	5.1E-02	3.0E-01	1.5E+01	<1	4.4E+01	<1
Thallium	4.7E-01	5.9E-05	0.0E+00	0.0E+00	5.9E-05	1.2E-03	1.3E-03	NA	--	NA	--
Vanadium	9.2E+00	1.6E-03	0.0E+00	0.0E+00	1.6E-03	2.4E-02	2.6E-02	1.1E+01	<1	5.7E+01	<1
Zinc	6.5E+03	2.1E+01	0.0E+00	0.0E+00	2.1E+01	1.7E+01	3.8E+01	1.5E+01	**2.6**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-68
MAXIMUM EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	4.1E-01	4.5E+01	0.0E+00	4.5E+01	5.3E+00	5.1E+01	NA	--	NA	--
Arsenic	4.3E+02	2.2E-01	2.8E+00	0.0E+00	3.0E+00	8.4E+00	1.1E+01	5.5E+00	**2.1**	2.2E+01	<1
Barium	2.5E+02	2.1E+00	3.7E+00	0.0E+00	5.8E+00	4.8E+00	1.1E+01	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	1.1E-03	1.5E-02	0.0E+00	1.6E-02	3.8E-02	5.4E-02	NA	--	NA	--
Cadmium	3.7E+03	3.1E+00	6.0E+02	0.0E+00	6.0E+02	7.1E+01	6.7E+02	1.9E+00	**354.3**	2.1E+01	**31.9**
Chromium	4.2E+01	1.7E-02	2.1E+00	0.0E+00	2.1E+00	8.2E-01	3.0E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	5.6E-02	1.0E+00	0.0E+00	1.1E+00	9.8E-01	2.1E+00	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	2.8E+00	8.1E+00	0.0E+00	1.1E+01	8.6E+01	9.7E+01	3.3E+01	**2.9**	6.2E+01	**1.6**
Lead	1.2E+05	1.0E+01	1.8E+03	0.0E+00	1.8E+03	2.4E+03	4.2E+03	7.4E+00	**565.1**	3.7E+01	**113.0**
Manganese	5.7E+03	7.8E+01	2.6E+01	0.0E+00	1.0E+02	1.1E+02	2.1E+02	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	3.0E-01	9.2E-01	0.0E+00	1.2E+00	2.8E+00	4.1E+00	4.5E-01	**9.0**	9.1E-01	**4.5**
Nickel	2.7E+01	7.0E-02	4.6E+00	0.0E+00	4.7E+00	5.1E-01	5.2E+00	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	3.7E+00	3.9E+00	0.0E+00	7.7E+00	1.7E+00	9.4E+00	4.0E-01	**23.4**	8.0E-01	**11.7**
Silver	4.1E+02	8.9E+00	1.4E+02	0.0E+00	1.5E+02	7.8E+00	1.5E+02	1.5E+01	**10.5**	4.4E+01	**3.5**
Thallium	1.1E+00	2.4E-04	1.8E-01	0.0E+00	1.8E-01	2.1E-02	2.0E-01	NA	--	NA	--
Vanadium	3.0E+01	9.0E-03	2.1E-01	0.0E+00	2.1E-01	5.7E-01	7.9E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	1.7E+02	6.3E+02	0.0E+00	8.1E+02	2.0E+03	2.8E+03	1.5E+01	**195.2**	1.3E+02	**21.6**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-69
MEAN EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO FACILITY
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	5.7E-02	5.4E+00	0.0E+00	5.4E+00	6.3E-01	6.1E+00	NA	--	NA	--
Arsenic	4.6E+01	6.4E-02	5.8E-01	0.0E+00	6.4E-01	8.8E-01	1.5E+00	5.5E+00	<1	2.2E+01	<1
Barium	7.9E+01	6.5E-01	1.2E+00	0.0E+00	1.8E+00	1.5E+00	3.4E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.6E-01	2.0E-04	2.7E-03	0.0E+00	2.9E-03	7.0E-03	9.9E-03	NA	--	NA	--
Cadmium	1.7E+02	5.7E-01	7.8E+01	0.0E+00	7.9E+01	3.2E+00	8.2E+01	1.9E+00	**43.1**	2.1E+01	**3.9**
Chromium	1.3E+01	5.1E-03	6.3E-01	0.0E+00	6.4E-01	2.4E-01	8.8E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.9E+00	6.4E-03	1.2E-01	0.0E+00	1.2E-01	1.1E-01	2.4E-01	7.6E+00	<1	3.8E+01	<1
Copper	2.6E+02	9.3E-01	3.8E+00	0.0E+00	4.7E+00	5.0E+00	9.7E+00	3.3E+01	<1	6.2E+01	<1
Lead	6.0E+03	1.9E+00	1.5E+02	0.0E+00	1.5E+02	1.2E+02	2.7E+02	7.4E+00	**36.6**	3.7E+01	**7.3**
Manganese	5.5E+02	7.5E+00	5.4E+00	0.0E+00	1.3E+01	1.1E+01	2.3E+01	9.8E+02	<1	4.9E+03	<1
Mercury	8.6E+00	6.4E-02	3.6E-01	0.0E+00	4.3E-01	1.7E-01	5.9E-01	4.5E-01	**1.3**	9.1E-01	<1
Nickel	7.6E+00	2.7E-02	1.3E+00	0.0E+00	1.3E+00	1.5E-01	1.5E+00	8.0E+01	<1	1.1E+02	<1
Selenium	7.3E+00	2.5E-01	6.5E-01	0.0E+00	9.0E-01	1.4E-01	1.0E+00	4.0E-01	**2.6**	8.0E-01	**1.3**
Silver	2.0E+01	4.3E-01	6.6E+00	0.0E+00	7.1E+00	3.8E-01	7.5E+00	1.5E+01	<1	4.4E+01	<1
Thallium	4.7E-01	1.0E-04	7.7E-02	0.0E+00	7.7E-02	9.0E-03	8.6E-02	NA	--	NA	--
Vanadium	9.2E+00	2.8E-03	6.4E-02	0.0E+00	6.7E-02	1.8E-01	2.4E-01	1.1E+01	<1	5.7E+01	<1
Zinc	6.5E+03	3.6E+01	2.5E+02	0.0E+00	2.9E+02	1.2E+02	4.1E+02	1.5E+01	**28.5**	1.3E+02	**3.1**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-70
MAXIMUM EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	6.8E-01	1.6E+01	0.0E+00	1.7E+01	1.7E+00	1.9E+01	NA	--	NA	--
Arsenic	4.3E+02	3.7E-01	1.0E+00	0.0E+00	1.4E+00	2.7E+00	4.1E+00	5.5E+00	<1	2.2E+01	<1
Barium	2.5E+02	3.4E+00	1.4E+00	0.0E+00	4.7E+00	1.6E+00	6.3E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	1.8E-03	5.4E-03	0.0E+00	7.2E-03	1.2E-02	2.0E-02	NA	--	NA	--
Cadmium	3.7E+03	5.1E+00	2.2E+02	0.0E+00	2.2E+02	2.3E+01	2.5E+02	1.9E+00	**129.8**	2.1E+01	**11.7**
Chromium	4.2E+01	2.9E-02	7.8E-01	0.0E+00	8.0E-01	2.6E-01	1.1E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	9.1E-02	3.7E-01	0.0E+00	4.6E-01	3.2E-01	7.8E-01	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	4.7E+00	2.9E+00	0.0E+00	7.6E+00	2.8E+01	3.5E+01	3.3E+01	**1.1**	6.2E+01	<1
Lead	1.2E+05	1.7E+01	6.5E+02	0.0E+00	6.7E+02	7.7E+02	1.4E+03	7.4E+00	**194.5**	3.7E+01	**38.9**
Manganese	5.7E+03	1.3E+02	9.6E+00	0.0E+00	1.4E+02	3.5E+01	1.7E+02	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	4.9E-01	3.4E-01	0.0E+00	8.3E-01	9.2E-01	1.7E+00	4.5E-01	**3.9**	9.1E-01	**1.9**
Nickel	2.7E+01	1.1E-01	1.7E+00	0.0E+00	1.8E+00	1.7E-01	2.0E+00	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	6.1E+00	1.4E+00	0.0E+00	7.6E+00	5.4E-01	8.1E+00	4.0E-01	**20.3**	8.0E-01	**10.2**
Silver	4.1E+02	1.5E+01	5.0E+01	0.0E+00	6.4E+01	2.5E+00	6.7E+01	1.5E+01	**4.6**	4.4E+01	**1.5**
Thallium	1.1E+00	4.0E-04	6.6E-02	0.0E+00	6.6E-02	6.9E-03	7.3E-02	NA	--	NA	--
Vanadium	3.0E+01	1.5E-02	7.5E-02	0.0E+00	9.0E-02	1.9E-01	2.8E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	2.8E+02	2.3E+02	0.0E+00	5.1E+02	6.5E+02	1.2E+03	1.5E+01	**80.6**	1.3E+02	**8.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-71
MEAN EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	9.3E-02	2.0E+00	0.0E+00	2.1E+00	2.0E-01	2.3E+00	NA	--	NA	--
Arsenic	4.6E+01	1.0E-01	2.1E-01	0.0E+00	3.2E-01	2.9E-01	6.0E-01	5.5E+00	<1	2.2E+01	<1
Barium	7.9E+01	1.1E+00	4.3E-01	0.0E+00	1.5E+00	5.0E-01	2.0E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.6E-01	3.3E-04	9.8E-04	0.0E+00	1.3E-03	2.3E-03	3.6E-03	NA	--	NA	--
Cadmium	1.7E+02	9.3E-01	2.9E+01	0.0E+00	2.9E+01	1.0E+00	3.0E+01	1.9E+00	**16.1**	2.1E+01	**1.4**
Chromium	1.3E+01	8.5E-03	2.3E-01	0.0E+00	2.4E-01	7.8E-02	3.2E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.9E+00	1.1E-02	4.3E-02	0.0E+00	5.3E-02	3.7E-02	9.0E-02	7.6E+00	<1	3.8E+01	<1
Copper	2.6E+02	1.5E+00	1.4E+00	0.0E+00	2.9E+00	1.6E+00	4.5E+00	3.3E+01	<1	6.2E+01	<1
Lead	6.0E+03	3.1E+00	5.6E+01	0.0E+00	5.9E+01	3.7E+01	9.6E+01	7.4E+00	**13.0**	3.7E+01	**2.6**
Manganese	5.5E+02	1.2E+01	2.0E+00	0.0E+00	1.4E+01	3.4E+00	1.8E+01	9.8E+02	<1	4.9E+03	<1
Mercury	8.6E+00	1.1E-01	1.3E-01	0.0E+00	2.4E-01	5.4E-02	2.9E-01	4.5E-01	<1	9.1E-01	<1
Nickel	7.6E+00	4.5E-02	4.8E-01	0.0E+00	5.3E-01	4.7E-02	5.7E-01	8.0E+01	<1	1.1E+02	<1
Selenium	7.3E+00	4.0E-01	2.4E-01	0.0E+00	6.4E-01	4.5E-02	6.9E-01	4.0E-01	**1.7**	8.0E-01	<1
Silver	2.0E+01	7.1E-01	2.4E+00	0.0E+00	3.1E+00	1.2E-01	3.3E+00	1.5E+01	<1	4.4E+01	<1
Thallium	4.7E-01	1.7E-04	2.8E-02	0.0E+00	2.8E-02	2.9E-03	3.1E-02	NA	--	NA	--
Vanadium	9.2E+00	4.6E-03	2.3E-02	0.0E+00	2.8E-02	5.8E-02	8.5E-02	1.1E+01	<1	5.7E+01	<1
Zinc	6.5E+03	5.9E+01	9.2E+01	0.0E+00	1.5E+02	4.0E+01	1.9E+02	1.5E+01	**13.2**	1.3E+02	**1.5**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-72
MAXIMUM EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	0.0E+00	0.0E+00	4.3E-03	4.3E-03	0.0E+00	4.3E-03	NA	--	NA	--
Arsenic	4.3E+02	0.0E+00	0.0E+00	9.0E-02	9.0E-02	0.0E+00	9.0E-02	5.5E+00	<1	2.2E+01	<1
Barium	2.5E+02	0.0E+00	0.0E+00	1.1E+00	1.1E+00	0.0E+00	1.1E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	0.0E+00	0.0E+00	1.6E-06	1.6E-06	0.0E+00	1.6E-06	NA	--	NA	--
Cadmium	3.7E+03	0.0E+00	0.0E+00	1.8E+00	1.8E+00	0.0E+00	1.8E+00	1.9E+00	<1	2.1E+01	<1
Chromium	4.2E+01	0.0E+00	0.0E+00	2.9E-01	2.9E-01	0.0E+00	2.9E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	0.0E+00	0.0E+00	8.3E-02	8.3E-02	0.0E+00	8.3E-02	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	0.0E+00	0.0E+00	2.9E+00	2.9E+00	0.0E+00	2.9E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+05	0.0E+00	0.0E+00	1.9E+01	1.9E+01	0.0E+00	1.9E+01	7.4E+00	**2.5**	3.7E+01	<1
Manganese	5.7E+03	0.0E+00	0.0E+00	4.5E-02	4.5E-02	0.0E+00	4.5E-02	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	0.0E+00	0.0E+00	6.3E-01	6.3E-01	0.0E+00	6.3E-01	4.5E-01	**1.4**	9.1E-01	<1
Nickel	2.7E+01	0.0E+00	0.0E+00	2.9E-01	2.9E-01	0.0E+00	2.9E-01	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	0.0E+00	0.0E+00	2.8E-01	2.8E-01	0.0E+00	2.8E-01	4.0E-01	<1	8.0E-01	<1
Silver	4.1E+02	0.0E+00	0.0E+00	3.9E-02	3.9E-02	0.0E+00	3.9E-02	1.5E+01	<1	4.4E+01	<1
Thallium	1.1E+00	0.0E+00	0.0E+00	9.8E-03	9.8E-03	0.0E+00	9.8E-03	NA	--	NA	--
Vanadium	3.0E+01	0.0E+00	0.0E+00	3.3E-05	3.3E-05	0.0E+00	3.3E-05	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	0.0E+00	0.0E+00	1.6E+01	1.6E+01	0.0E+00	1.6E+01	1.5E+01	**1.1**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-73
MEAN EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$ [d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	0.0E+00	0.0E+00	5.2E-04	5.2E-04	0.0E+00	5.2E-04	NA	--	NA	--
Arsenic	4.6E+01	0.0E+00	0.0E+00	1.4E-02	1.4E-02	0.0E+00	1.4E-02	5.5E+00	<1	2.2E+01	<1
Barium	7.9E+01	0.0E+00	0.0E+00	3.6E-01	3.6E-01	0.0E+00	3.6E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	3.6E-01	0.0E+00	0.0E+00	2.9E-07	2.9E-07	0.0E+00	2.9E-07	NA	--	NA	--
Cadmium	1.7E+02	0.0E+00	0.0E+00	3.1E-01	3.1E-01	0.0E+00	3.1E-01	1.9E+00	<1	2.1E+01	<1
Chromium	1.3E+01	0.0E+00	0.0E+00	1.2E-01	1.2E-01	0.0E+00	1.2E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.9E+00	0.0E+00	0.0E+00	9.6E-03	9.6E-03	0.0E+00	9.6E-03	7.6E+00	<1	3.8E+01	<1
Copper	2.6E+02	0.0E+00	0.0E+00	1.8E+00	1.8E+00	0.0E+00	1.8E+00	3.3E+01	<1	6.2E+01	<1
Lead	6.0E+03	0.0E+00	0.0E+00	3.9E+00	3.9E+00	0.0E+00	3.9E+00	7.4E+00	<1	3.7E+01	<1
Manganese	5.5E+02	0.0E+00	0.0E+00	4.4E-03	4.4E-03	0.0E+00	4.4E-03	9.8E+02	<1	4.9E+03	<1
Mercury	8.6E+00	0.0E+00	0.0E+00	3.7E-02	3.7E-02	0.0E+00	3.7E-02	4.5E-01	<1	9.1E-01	<1
Nickel	7.6E+00	0.0E+00	0.0E+00	1.6E-01	1.6E-01	0.0E+00	1.6E-01	8.0E+01	<1	1.1E+02	<1
Selenium	7.3E+00	0.0E+00	0.0E+00	1.1E-01	1.1E-01	0.0E+00	1.1E-01	4.0E-01	<1	8.0E-01	<1
Silver	2.0E+01	0.0E+00	0.0E+00	1.9E-03	1.9E-03	0.0E+00	1.9E-03	1.5E+01	<1	4.4E+01	<1
Thallium	4.7E-01	0.0E+00	0.0E+00	4.2E-03	4.2E-03	0.0E+00	4.2E-03	NA	--	NA	--
Vanadium	9.2E+00	0.0E+00	0.0E+00	1.0E-05	1.0E-05	0.0E+00	1.0E-05	1.1E+01	<1	5.7E+01	<1
Zinc	6.5E+03	0.0E+00	0.0E+00	1.3E+01	1.3E+01	0.0E+00	1.3E+01	1.5E+01	<1	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item i (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-74
MAXIMUM EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.0E+02	5.5E-01	0.0E+00	0.0E+00	5.5E-01	4.1E-01	9.6E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.3E+02	2.1E-01	0.0E+00	0.0E+00	2.1E-01	4.4E-01	6.5E-01	5.7E+00	<1	1.2E+01	<1
Barium	3.9E+02	3.0E+00	0.0E+00	0.0E+00	3.0E+00	4.0E-01	3.4E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	1.0E-03	0.0E+00	0.0E+00	1.0E-03	2.0E-03	3.0E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	2.9E+00	0.0E+00	0.0E+00	2.9E+00	3.7E+00	6.6E+00	5.1E+00	**1.3**	7.1E+00	<1
Chromium	4.2E+01	1.6E-02	0.0E+00	0.0E+00	1.6E-02	4.3E-02	5.9E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	5.2E-02	0.0E+00	0.0E+00	5.2E-02	5.2E-02	1.0E-01	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	2.6E+00	0.0E+00	0.0E+00	2.6E+00	4.5E+00	7.2E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	9.6E+00	0.0E+00	0.0E+00	9.6E+00	1.3E+02	1.4E+02	3.4E+01	**4.0**	8.0E+01	**1.7**
Manganese	5.7E+03	7.2E+01	0.0E+00	0.0E+00	7.2E+01	5.8E+00	7.8E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	2.8E-01	0.0E+00	0.0E+00	2.8E-01	1.5E-01	4.3E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	6.5E-02	0.0E+00	0.0E+00	6.5E-02	2.7E-02	9.2E-02	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	3.5E+00	0.0E+00	0.0E+00	3.5E+00	8.8E-02	3.6E+00	3.5E-01	**10.2**	1.1E+00	**3.4**
Silver	4.1E+02	8.2E+00	0.0E+00	0.0E+00	8.2E+00	4.1E-01	8.6E+00	4.4E+01	<1	2.2E+02	<1
Thallium	3.1E+00	6.3E-04	0.0E+00	0.0E+00	6.3E-04	3.1E-03	3.8E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	8.3E-03	0.0E+00	0.0E+00	8.3E-03	3.0E-02	3.9E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	1.6E+02	0.0E+00	0.0E+00	1.6E+02	1.1E+02	2.7E+02	1.6E+02	**1.7**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-75
MEAN EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.1E+01	6.5E-02	0.0E+00	0.0E+00	6.5E-02	4.2E-02	1.1E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.0E+01	5.5E-02	0.0E+00	0.0E+00	5.5E-02	4.1E-02	9.6E-02	5.7E+00	<1	1.2E+01	<1
Barium	7.5E+01	5.7E-01	0.0E+00	0.0E+00	5.7E-01	7.6E-02	6.5E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.1E-01	1.6E-04	0.0E+00	0.0E+00	1.6E-04	3.1E-04	4.7E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	1.7E+02	5.2E-01	0.0E+00	0.0E+00	5.2E-01	1.7E-01	6.9E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.3E+01	4.9E-03	0.0E+00	0.0E+00	4.9E-03	1.3E-02	1.8E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	4.9E+00	4.9E-03	0.0E+00	0.0E+00	4.9E-03	4.9E-03	9.9E-03	7.3E+00	<1	3.7E+01	<1
Copper	2.7E+02	8.8E-01	0.0E+00	0.0E+00	8.8E-01	2.7E-01	1.1E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.3E+03	1.6E+00	0.0E+00	0.0E+00	1.6E+00	5.4E+00	7.0E+00	3.4E+01	<1	8.0E+01	<1
Manganese	3.8E+02	4.8E+00	0.0E+00	0.0E+00	4.8E+00	3.8E-01	5.2E+00	8.8E+01	<1	2.8E+02	<1
Mercury	8.7E+00	6.0E-02	0.0E+00	0.0E+00	6.0E-02	8.8E-03	6.9E-02	1.3E+01	<1	5.6E+01	<1
Nickel	7.1E+00	2.4E-02	0.0E+00	0.0E+00	2.4E-02	7.2E-03	3.1E-02	6.0E+01	<1	8.0E+01	<1
Selenium	7.6E+00	2.4E-01	0.0E+00	0.0E+00	2.4E-01	7.7E-03	2.5E-01	3.5E-01	<1	1.1E+00	<1
Silver	1.7E+01	3.5E-01	0.0E+00	0.0E+00	3.5E-01	1.7E-02	3.7E-01	4.4E+01	<1	2.2E+02	<1
Thallium	4.8E-01	9.9E-05	0.0E+00	0.0E+00	9.9E-05	4.9E-04	5.9E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	2.4E-03	0.0E+00	0.0E+00	2.4E-03	8.8E-03	1.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	6.5E+03	3.4E+01	0.0E+00	0.0E+00	3.4E+01	6.6E+00	4.0E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-76
MAXIMUM EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	1.1E-01	0.0E+00	0.0E+00	1.1E-01	8.0E-02	1.9E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.3E+02	6.0E-02	0.0E+00	0.0E+00	6.0E-02	1.3E-01	1.9E-01	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	5.5E-01	0.0E+00	0.0E+00	5.5E-01	7.3E-02	6.2E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	2.9E-04	0.0E+00	0.0E+00	2.9E-04	5.8E-04	8.8E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	8.3E-01	0.0E+00	0.0E+00	8.3E-01	1.1E+00	1.9E+00	5.1E+00	<1	7.1E+00	<1
Chromium	4.2E+01	4.7E-03	0.0E+00	0.0E+00	4.7E-03	1.2E-02	1.7E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	1.5E-02	0.0E+00	0.0E+00	1.5E-02	1.5E-02	3.0E-02	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	7.6E-01	0.0E+00	0.0E+00	7.6E-01	1.3E+00	2.1E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	2.8E+00	0.0E+00	0.0E+00	2.8E+00	3.6E+01	3.9E+01	3.4E+01	**1.2**	8.0E+01	<1
Manganese	5.7E+03	2.1E+01	0.0E+00	0.0E+00	2.1E+01	1.7E+00	2.3E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	8.0E-02	0.0E+00	0.0E+00	8.0E-02	4.3E-02	1.2E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	1.9E-02	0.0E+00	0.0E+00	1.9E-02	7.8E-03	2.7E-02	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	1.0E+00	0.0E+00	0.0E+00	1.0E+00	2.5E-02	1.0E+00	3.5E-01	**2.9**	1.1E+00	<1
Silver	4.1E+02	2.4E+00	0.0E+00	0.0E+00	2.4E+00	1.2E-01	2.5E+00	4.4E+01	<1	2.2E+02	<1
Thallium	1.1E+00	6.5E-05	0.0E+00	0.0E+00	6.5E-05	3.2E-04	3.9E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	2.4E-03	0.0E+00	0.0E+00	2.4E-03	8.7E-03	1.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	4.6E+01	0.0E+00	0.0E+00	4.6E+01	3.1E+01	7.7E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-77
MEAN EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	1.5E-02	0.0E+00	0.0E+00	1.5E-02	9.6E-03	2.5E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	4.6E+01	1.7E-02	0.0E+00	0.0E+00	1.7E-02	1.3E-02	3.0E-02	5.7E+00	<1	1.2E+01	<1
Barium	7.9E+01	1.7E-01	0.0E+00	0.0E+00	1.7E-01	2.3E-02	2.0E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.6E-01	5.3E-05	0.0E+00	0.0E+00	5.3E-05	1.1E-04	1.6E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	1.7E+02	1.5E-01	0.0E+00	0.0E+00	1.5E-01	4.9E-02	2.0E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.3E+01	1.4E-03	0.0E+00	0.0E+00	1.4E-03	3.7E-03	5.1E-03	7.4E+00	<1	3.7E+01	<1
Cobalt	5.9E+00	1.7E-03	0.0E+00	0.0E+00	1.7E-03	1.7E-03	3.4E-03	7.3E+00	<1	3.7E+01	<1
Copper	2.6E+02	2.5E-01	0.0E+00	0.0E+00	2.5E-01	7.6E-02	3.3E-01	1.2E+01	<1	1.5E+01	<1
Lead	6.0E+03	5.1E-01	0.0E+00	0.0E+00	5.1E-01	1.8E+00	2.3E+00	3.4E+01	<1	8.0E+01	<1
Manganese	5.5E+02	2.0E+00	0.0E+00	0.0E+00	2.0E+00	1.6E-01	2.2E+00	8.8E+01	<1	2.8E+02	<1
Mercury	8.6E+00	1.7E-02	0.0E+00	0.0E+00	1.7E-02	2.5E-03	2.0E-02	1.3E+01	<1	5.6E+01	<1
Nickel	7.6E+00	7.3E-03	0.0E+00	0.0E+00	7.3E-03	2.2E-03	9.5E-03	6.0E+01	<1	8.0E+01	<1
Selenium	7.3E+00	6.6E-02	0.0E+00	0.0E+00	6.6E-02	2.1E-03	6.8E-02	3.5E-01	<1	1.1E+00	<1
Silver	2.0E+01	1.2E-01	0.0E+00	0.0E+00	1.2E-01	5.8E-03	1.2E-01	4.4E+01	<1	2.2E+02	<1
Thallium	4.7E-01	2.7E-05	0.0E+00	0.0E+00	2.7E-05	1.4E-04	1.6E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	9.2E+00	7.4E-04	0.0E+00	0.0E+00	7.4E-04	2.7E-03	3.5E-03	5.9E+00	<1	8.3E+00	<1
Zinc	6.5E+03	9.7E+00	0.0E+00	0.0E+00	9.7E+00	1.9E+00	1.2E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-78
MAXIMUM EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	8.5E-01	3.1E+01	0.0E+00	3.1E+01	1.5E+00	3.3E+01	1.3E+01	**2.5**	6.7E+01	<1
Arsenic	4.3E+02	4.6E-01	1.9E+00	0.0E+00	2.4E+00	2.3E+00	4.7E+00	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	4.2E+00	2.5E+00	0.0E+00	6.8E+00	1.3E+00	8.1E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	2.2E-03	1.0E-02	0.0E+00	1.2E-02	1.1E-02	2.3E-02	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	6.3E+00	4.1E+02	0.0E+00	4.1E+02	2.0E+01	4.3E+02	5.1E+00	**85.2**	7.1E+00	**61.2**
Chromium	4.2E+01	3.6E-02	1.5E+00	0.0E+00	1.5E+00	2.3E-01	1.7E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	1.1E-01	6.9E-01	0.0E+00	8.1E-01	2.7E-01	1.1E+00	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	5.8E+00	5.5E+00	0.0E+00	1.1E+01	2.4E+01	3.5E+01	1.2E+01	**3.0**	1.5E+01	**2.3**
Lead	1.2E+05	2.1E+01	1.2E+03	0.0E+00	1.2E+03	6.7E+02	1.9E+03	3.4E+01	**55.9**	8.0E+01	**23.8**
Manganese	5.7E+03	1.6E+02	1.8E+01	0.0E+00	1.8E+02	3.1E+01	2.1E+02	8.8E+01	**2.4**	2.8E+02	<1
Mercury	1.5E+02	6.1E-01	6.3E-01	0.0E+00	1.2E+00	7.9E-01	2.0E+00	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	1.4E-01	3.2E+00	0.0E+00	3.3E+00	1.4E-01	3.5E+00	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	7.7E+00	2.7E+00	0.0E+00	1.0E+01	4.6E-01	1.1E+01	3.5E-01	**30.9**	1.1E+00	**10.3**
Silver	4.1E+02	1.8E+01	9.3E+01	0.0E+00	1.1E+02	2.2E+00	1.1E+02	4.4E+01	**2.5**	2.2E+02	<1
Thallium	1.1E+00	4.9E-04	1.2E-01	0.0E+00	1.2E-01	5.9E-03	1.3E-01	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	1.8E-02	1.4E-01	0.0E+00	1.6E-01	1.6E-01	3.2E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	3.5E+02	4.3E+02	0.0E+00	7.8E+02	5.6E+02	1.3E+03	1.6E+02	**8.4**	3.2E+02	**4.2**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-79
MEAN EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	1.2E-01	3.7E+00	0.0E+00	3.8E+00	1.8E-01	4.0E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	4.6E+01	1.3E-01	3.9E-01	0.0E+00	5.2E-01	2.5E-01	7.7E-01	5.7E+00	<1	1.2E+01	<1
Barium	7.9E+01	1.3E+00	8.1E-01	0.0E+00	2.1E+00	4.3E-01	2.6E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.6E-01	4.1E-04	1.8E-03	0.0E+00	2.2E-03	2.0E-03	4.2E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	1.7E+02	1.2E+00	5.3E+01	0.0E+00	5.4E+01	9.0E-01	5.5E+01	5.1E+00	**10.9**	7.1E+00	**7.8**
Chromium	1.3E+01	1.1E-02	4.3E-01	0.0E+00	4.4E-01	6.7E-02	5.1E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	5.9E+00	1.3E-02	8.0E-02	0.0E+00	9.3E-02	3.2E-02	1.2E-01	7.3E+00	<1	3.7E+01	<1
Copper	2.6E+02	1.9E+00	2.6E+00	0.0E+00	4.5E+00	1.4E+00	5.9E+00	1.2E+01	<1	1.5E+01	<1
Lead	6.0E+03	3.9E+00	1.0E+02	0.0E+00	1.1E+02	3.2E+01	1.4E+02	3.4E+01	**4.1**	8.0E+01	**1.8**
Manganese	5.5E+02	1.5E+01	3.7E+00	0.0E+00	1.9E+01	3.0E+00	2.2E+01	8.8E+01	<1	2.8E+02	<1
Mercury	8.6E+00	1.3E-01	2.5E-01	0.0E+00	3.8E-01	4.6E-02	4.2E-01	1.3E+01	<1	5.6E+01	<1
Nickel	7.6E+00	5.6E-02	9.0E-01	0.0E+00	9.5E-01	4.1E-02	9.9E-01	6.0E+01	<1	8.0E+01	<1
Selenium	7.3E+00	5.0E-01	4.4E-01	0.0E+00	9.5E-01	3.9E-02	9.9E-01	3.5E-01	**2.8**	1.1E+00	<1
Silver	2.0E+01	8.9E-01	4.5E+00	0.0E+00	5.4E+00	1.1E-01	5.5E+00	4.4E+01	<1	2.2E+02	<1
Thallium	4.7E-01	2.1E-04	5.2E-02	0.0E+00	5.2E-02	2.5E-03	5.5E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	9.2E+00	5.7E-03	4.3E-02	0.0E+00	4.9E-02	5.0E-02	9.9E-02	5.9E+00	<1	8.3E+00	<1
Zinc	6.5E+03	7.4E+01	1.7E+02	0.0E+00	2.5E+02	3.5E+01	2.8E+02	1.6E+02	**1.8**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-80
MAXIMUM EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.0E+02	0.0E+00	5.4E+01	0.0E+00	5.4E+01	7.0E+00	6.1E+01	1.3E+01	**4.6**	6.7E+01	<1
Arsenic	4.3E+02	0.0E+00	2.3E+00	0.0E+00	2.3E+00	7.5E+00	9.8E+00	5.7E+00	**1.7**	1.2E+01	<1
Barium	3.9E+02	0.0E+00	4.8E+00	0.0E+00	4.8E+00	6.8E+00	1.2E+01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	0.0E+00	1.2E-02	0.0E+00	1.2E-02	3.5E-02	4.7E-02	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	0.0E+00	4.9E+02	0.0E+00	4.9E+02	6.4E+01	5.5E+02	5.1E+00	**108.3**	7.1E+00	**77.8**
Chromium	4.2E+01	0.0E+00	1.7E+00	0.0E+00	1.7E+00	7.4E-01	2.5E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	0.0E+00	8.3E-01	0.0E+00	8.3E-01	8.9E-01	1.7E+00	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	0.0E+00	6.6E+00	0.0E+00	6.6E+00	7.8E+01	8.4E+01	1.2E+01	**7.2**	1.5E+01	**5.6**
Lead	1.2E+05	0.0E+00	1.5E+03	0.0E+00	1.5E+03	2.2E+03	3.6E+03	3.4E+01	**106.2**	8.0E+01	**45.1**
Manganese	5.7E+03	0.0E+00	2.2E+01	0.0E+00	2.2E+01	9.9E+01	1.2E+02	8.8E+01	**1.4**	2.8E+02	<1
Mercury	1.5E+02	0.0E+00	7.5E-01	0.0E+00	7.5E-01	2.6E+00	3.3E+00	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	0.0E+00	3.8E+00	0.0E+00	3.8E+00	4.7E-01	4.3E+00	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	0.0E+00	3.2E+00	0.0E+00	3.2E+00	1.5E+00	4.7E+00	3.5E-01	**13.5**	1.1E+00	**4.5**
Silver	4.1E+02	0.0E+00	1.1E+02	0.0E+00	1.1E+02	7.1E+00	1.2E+02	4.4E+01	**2.7**	2.2E+02	<1
Thallium	3.1E+00	0.0E+00	4.1E-01	0.0E+00	4.1E-01	5.4E-02	4.7E-01	2.0E-01	**2.3**	1.0E+00	<1
Vanadium	3.0E+01	0.0E+00	1.7E-01	0.0E+00	1.7E-01	5.2E-01	6.9E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	0.0E+00	5.2E+02	0.0E+00	5.2E+02	1.8E+03	2.3E+03	1.6E+02	**14.7**	3.2E+02	**7.3**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-81
MEAN EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.1E+01	0.0E+00	5.5E+00	0.0E+00	5.5E+00	7.1E-01	6.2E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	4.0E+01	0.0E+00	4.3E-01	0.0E+00	4.3E-01	7.0E-01	1.1E+00	5.7E+00	<1	1.2E+01	<1
Barium	7.5E+01	0.0E+00	9.1E-01	0.0E+00	9.1E-01	1.3E+00	2.2E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.1E-01	0.0E+00	1.9E-03	0.0E+00	1.9E-03	5.4E-03	7.2E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	1.7E+02	0.0E+00	6.4E+01	0.0E+00	6.4E+01	2.9E+00	6.7E+01	5.1E+00	**13.1**	7.1E+00	**9.4**
Chromium	1.3E+01	0.0E+00	5.3E-01	0.0E+00	5.3E-01	2.3E-01	7.6E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	4.9E+00	0.0E+00	7.9E-02	0.0E+00	7.9E-02	8.5E-02	1.6E-01	7.3E+00	<1	3.7E+01	<1
Copper	2.7E+02	0.0E+00	3.1E+00	0.0E+00	3.1E+00	4.6E+00	7.7E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.3E+03	0.0E+00	1.1E+02	0.0E+00	1.1E+02	9.2E+01	2.0E+02	3.4E+01	**6.0**	8.0E+01	**2.6**
Manganese	3.8E+02	0.0E+00	3.4E+00	0.0E+00	3.4E+00	6.5E+00	9.9E+00	8.8E+01	<1	2.8E+02	<1
Mercury	8.7E+00	0.0E+00	3.0E-01	0.0E+00	3.0E-01	1.5E-01	4.5E-01	1.3E+01	<1	5.6E+01	<1
Nickel	7.1E+00	0.0E+00	1.0E+00	0.0E+00	1.0E+00	1.2E-01	1.1E+00	6.0E+01	<1	8.0E+01	<1
Selenium	7.6E+00	0.0E+00	5.4E-01	0.0E+00	5.4E-01	1.3E-01	6.8E-01	3.5E-01	**1.9**	1.1E+00	<1
Silver	1.7E+01	0.0E+00	4.7E+00	0.0E+00	4.7E+00	3.0E-01	5.0E+00	4.4E+01	<1	2.2E+02	<1
Thallium	4.8E-01	0.0E+00	6.5E-02	0.0E+00	6.5E-02	8.4E-03	7.3E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	0.0E+00	4.9E-02	0.0E+00	4.9E-02	1.5E-01	2.0E-01	5.9E+00	<1	8.3E+00	<1
Zinc	6.5E+03	0.0E+00	2.1E+02	0.0E+00	2.1E+02	1.1E+02	3.2E+02	1.6E+02	**2.0**	3.2E+02	**1.0**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-82
MAXIMUM EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	2.5E-02	0.0E+00	1.6E-03	2.6E-02	2.5E-01	2.7E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.3E+02	1.3E-02	0.0E+00	3.3E-02	4.6E-02	3.9E-01	4.4E-01	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	1.2E-01	0.0E+00	4.1E-01	5.4E-01	2.3E-01	7.6E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	6.5E-05	0.0E+00	5.8E-07	6.5E-05	1.8E-03	1.9E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	1.8E-01	0.0E+00	6.5E-01	8.4E-01	3.3E+00	4.2E+00	5.1E+00	<1	7.1E+00	<1
Chromium	4.2E+01	1.0E-03	0.0E+00	1.1E-01	1.1E-01	3.8E-02	1.5E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	3.3E-03	0.0E+00	3.0E-02	3.4E-02	4.6E-02	8.0E-02	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	1.7E-01	0.0E+00	1.1E+00	1.2E+00	4.1E+00	5.3E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	6.1E-01	0.0E+00	6.9E+00	7.5E+00	1.1E+02	1.2E+02	3.4E+01	**3.5**	8.0E+01	**1.5**
Manganese	5.7E+03	4.6E+00	0.0E+00	1.7E-02	4.6E+00	5.2E+00	9.8E+00	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	1.8E-02	0.0E+00	2.3E-01	2.5E-01	1.3E-01	3.8E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	4.1E-03	0.0E+00	1.1E-01	1.1E-01	2.4E-02	1.3E-01	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	2.2E-01	0.0E+00	1.0E-01	3.3E-01	7.9E-02	4.0E-01	3.5E-01	**1.2**	1.1E+00	<1
Silver	4.1E+02	5.3E-01	0.0E+00	1.4E-02	5.4E-01	3.7E-01	9.1E-01	4.4E+01	<1	2.2E+02	<1
Thallium	1.1E+00	1.4E-05	0.0E+00	3.6E-03	3.6E-03	1.0E-03	4.6E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	5.3E-04	0.0E+00	1.2E-05	5.4E-04	2.7E-02	2.8E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	1.0E+01	0.0E+00	6.0E+00	1.6E+01	9.6E+01	1.1E+02	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-83
MEAN EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.3E+01	3.4E-03	0.0E+00	1.9E-04	3.6E-03	3.0E-02	3.3E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	4.6E+01	3.8E-03	0.0E+00	5.3E-03	9.0E-03	4.2E-02	5.1E-02	5.7E+00	<1	1.2E+01	<1
Barium	7.9E+01	3.9E-02	0.0E+00	1.3E-01	1.7E-01	7.2E-02	2.4E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.6E-01	1.2E-05	0.0E+00	1.1E-07	1.2E-05	3.3E-04	3.4E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	1.7E+02	3.4E-02	0.0E+00	1.1E-01	1.5E-01	1.5E-01	3.0E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.3E+01	3.1E-04	0.0E+00	4.3E-02	4.4E-02	1.1E-02	5.5E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.9E+00	3.8E-04	0.0E+00	3.5E-03	3.9E-03	5.3E-03	9.2E-03	7.3E+00	<1	3.7E+01	<1
Copper	2.6E+02	5.5E-02	0.0E+00	6.5E-01	7.0E-01	2.4E-01	9.4E-01	1.2E+01	<1	1.5E+01	<1
Lead	6.0E+03	1.1E-01	0.0E+00	1.4E+00	1.6E+00	5.5E+00	7.0E+00	3.4E+01	<1	8.0E+01	<1
Manganese	5.5E+02	4.5E-01	0.0E+00	1.6E-03	4.5E-01	5.0E-01	9.5E-01	8.8E+01	<1	2.8E+02	<1
Mercury	8.6E+00	3.8E-03	0.0E+00	1.4E-02	1.7E-02	7.8E-03	2.5E-02	1.3E+01	<1	5.6E+01	<1
Nickel	7.6E+00	1.6E-03	0.0E+00	5.9E-02	6.0E-02	6.9E-03	6.7E-02	6.0E+01	<1	8.0E+01	<1
Selenium	7.3E+00	1.5E-02	0.0E+00	4.1E-02	5.5E-02	6.6E-03	6.2E-02	3.5E-01	<1	1.1E+00	<1
Silver	2.0E+01	2.6E-02	0.0E+00	6.9E-04	2.6E-02	1.8E-02	4.4E-02	4.4E+01	<1	2.2E+02	<1
Thallium	4.7E-01	6.1E-06	0.0E+00	1.5E-03	1.5E-03	4.2E-04	2.0E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	9.2E+00	1.6E-04	0.0E+00	3.7E-06	1.7E-04	8.4E-03	8.6E-03	5.9E+00	<1	8.3E+00	<1
Zinc	6.5E+03	2.1E+00	0.0E+00	4.9E+00	7.0E+00	5.9E+00	1.3E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

TABLE F-84
MAXIMUM EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	1.4E-01	0.0E+00	0.0E+00	1.4E-01	4.0E-01	5.3E-01	NA	--	NA	--
Arsenic	1.5E+02	7.0E-02	0.0E+00	0.0E+00	7.0E-02	3.8E-01	4.5E-01	5.5E+00	<1	2.2E+01	<1
Barium	2.1E+02	1.0E+00	0.0E+00	0.0E+00	1.0E+00	5.6E-01	1.6E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	6.3E-04	0.0E+00	0.0E+00	6.3E-04	5.2E-03	5.8E-03	NA	--	NA	--
Cadmium	8.1E+01	2.2E-01	0.0E+00	0.0E+00	2.2E-01	2.1E-01	4.3E-01	1.9E+00	<1	2.1E+01	<1
Chromium	2.8E+01	6.5E-03	0.0E+00	0.0E+00	6.5E-03	7.2E-02	7.8E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	5.8E+00	3.7E-03	0.0E+00	0.0E+00	3.7E-03	1.5E-02	1.9E-02	7.6E+00	<1	3.8E+01	<1
Copper	3.6E+02	6.2E-01	0.0E+00	0.0E+00	6.2E-01	9.3E-01	1.6E+00	3.3E+01	<1	6.2E+01	<1
Lead	8.7E+03	1.3E+00	0.0E+00	0.0E+00	1.3E+00	2.3E+01	2.4E+01	7.4E+00	**3.2**	3.7E+01	<1
Manganese	4.5E+02	3.5E+00	0.0E+00	0.0E+00	3.5E+00	1.2E+00	4.7E+00	9.8E+02	<1	4.9E+03	<1
Mercury	1.7E+01	5.3E-02	0.0E+00	0.0E+00	5.3E-02	4.3E-02	9.6E-02	4.5E-01	<1	9.1E-01	<1
Nickel	2.7E+01	4.1E-02	0.0E+00	0.0E+00	4.1E-02	7.0E-02	1.1E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.5E+01	5.5E-01	0.0E+00	0.0E+00	5.5E-01	6.4E-02	6.1E-01	4.0E-01	**1.5**	8.0E-01	<1
Silver	2.7E+01	3.4E-01	0.0E+00	0.0E+00	3.4E-01	7.0E-02	4.1E-01	1.5E+01	<1	4.4E+01	<1
Thallium	4.4E-01	5.6E-05	0.0E+00	0.0E+00	5.6E-05	1.1E-03	1.2E-03	NA	--	NA	--
Vanadium	2.4E+01	4.2E-03	0.0E+00	0.0E+00	4.2E-03	6.2E-02	6.6E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	2.7E+01	0.0E+00	0.0E+00	2.7E+01	2.7E+01	5.4E+01	1.5E+01	**3.8**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-85
MEAN EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	1.5E-02	0.0E+00	0.0E+00	1.5E-02	3.6E-02	5.0E-02	NA	--	NA	--
Arsenic	2.5E+01	2.6E-02	0.0E+00	0.0E+00	2.6E-02	6.5E-02	9.1E-02	5.5E+00	<1	2.2E+01	<1
Barium	6.6E+01	3.2E-01	0.0E+00	0.0E+00	3.2E-01	1.7E-01	4.9E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	3.9E-01	1.2E-04	0.0E+00	0.0E+00	1.2E-04	1.0E-03	1.1E-03	NA	--	NA	--
Cadmium	1.5E+01	8.8E-02	0.0E+00	0.0E+00	8.8E-02	4.0E-02	1.3E-01	1.9E+00	<1	2.1E+01	<1
Chromium	1.1E+01	2.5E-03	0.0E+00	0.0E+00	2.5E-03	2.8E-02	3.0E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	2.0E+00	1.2E-03	0.0E+00	0.0E+00	1.2E-03	5.1E-03	6.3E-03	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+01	3.3E-01	0.0E+00	0.0E+00	3.3E-01	1.9E-01	5.3E-01	3.3E+01	<1	6.2E+01	<1
Lead	1.1E+03	4.2E-01	0.0E+00	0.0E+00	4.2E-01	2.9E+00	3.3E+00	7.4E+00	<1	3.7E+01	<1
Manganese	9.2E+01	7.3E-01	0.0E+00	0.0E+00	7.3E-01	2.4E-01	9.7E-01	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+00	1.8E-02	0.0E+00	0.0E+00	1.8E-02	6.0E-03	2.4E-02	4.5E-01	<1	9.1E-01	<1
Nickel	7.2E+00	1.5E-02	0.0E+00	0.0E+00	1.5E-02	1.9E-02	3.4E-02	8.0E+01	<1	1.1E+02	<1
Selenium	3.9E+00	7.2E-02	0.0E+00	0.0E+00	7.2E-02	1.0E-02	8.2E-02	4.0E-01	<1	8.0E-01	<1
Silver	3.7E+00	4.6E-02	0.0E+00	0.0E+00	4.6E-02	9.5E-03	5.6E-02	1.5E+01	<1	4.4E+01	<1
Thallium	4.5E-01	5.7E-05	0.0E+00	0.0E+00	5.7E-05	1.2E-03	1.2E-03	NA	--	NA	--
Vanadium	7.4E+00	1.3E-03	0.0E+00	0.0E+00	1.3E-03	1.9E-02	2.1E-02	1.1E+01	<1	5.7E+01	<1
Zinc	2.2E+03	1.1E+01	0.0E+00	0.0E+00	1.1E+01	5.7E+00	1.7E+01	1.5E+01	1.2	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-86
MAXIMUM EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	2.4E-01	2.5E+01	0.0E+00	2.5E+01	2.9E+00	2.8E+01	NA	--	NA	--
Arsenic	1.5E+02	1.2E-01	1.3E+00	0.0E+00	1.4E+00	2.8E+00	4.2E+00	5.5E+00	<1	2.2E+01	<1
Barium	2.1E+02	1.8E+00	3.2E+00	0.0E+00	5.0E+00	4.1E+00	9.1E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	1.1E-03	1.5E-02	0.0E+00	1.6E-02	3.8E-02	5.4E-02	NA	--	NA	--
Cadmium	8.1E+01	3.8E-01	4.9E+01	0.0E+00	4.9E+01	1.6E+00	5.1E+01	1.9E+00	**26.6**	2.1E+01	**2.4**
Chromium	2.8E+01	1.1E-02	1.4E+00	0.0E+00	1.4E+00	5.3E-01	1.9E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	5.8E+00	6.4E-03	1.2E-01	0.0E+00	1.2E-01	1.1E-01	2.3E-01	7.6E+00	<1	3.8E+01	<1
Copper	3.6E+02	1.1E+00	4.1E+00	0.0E+00	5.2E+00	6.9E+00	1.2E+01	3.3E+01	<1	6.2E+01	<1
Lead	8.7E+03	2.3E+00	2.1E+02	0.0E+00	2.1E+02	1.7E+02	3.8E+02	7.4E+00	**50.7**	3.7E+01	**10.1**
Manganese	4.5E+02	6.1E+00	4.7E+00	0.0E+00	1.1E+01	8.6E+00	1.9E+01	9.8E+02	<1	4.9E+03	<1
Mercury	1.7E+01	9.2E-02	4.5E-01	0.0E+00	5.4E-01	3.2E-01	8.6E-01	4.5E-01	**1.9**	9.1E-01	<1
Nickel	2.7E+01	7.0E-02	4.6E+00	0.0E+00	4.7E+00	5.1E-01	5.2E+00	8.0E+01	<1	1.1E+02	<1
Selenium	2.5E+01	9.4E-01	1.6E+00	0.0E+00	2.5E+00	4.7E-01	3.0E+00	4.0E-01	**7.5**	8.0E-01	**3.7**
Silver	2.7E+01	5.9E-01	9.0E+00	0.0E+00	9.6E+00	5.1E-01	1.0E+01	1.5E+01	<1	4.4E+01	<1
Thallium	4.4E-01	9.6E-05	7.2E-02	0.0E+00	7.2E-02	8.5E-03	8.1E-02	NA	--	NA	--
Vanadium	2.4E+01	7.2E-03	1.7E-01	0.0E+00	1.7E-01	4.6E-01	6.3E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	4.7E+01	2.9E+02	0.0E+00	3.4E+02	2.0E+02	5.4E+02	1.5E+01	**37.4**	1.3E+02	**4.1**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-87
MEAN EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	2.5E-02	2.3E+00	0.0E+00	2.3E+00	2.6E-01	2.5E+00	NA	--	NA	--
Arsenic	2.5E+01	4.5E-02	3.8E-01	0.0E+00	4.2E-01	4.8E-01	9.0E-01	5.5E+00	<1	2.2E+01	<1
Barium	6.6E+01	5.4E-01	9.9E-01	0.0E+00	1.5E+00	1.3E+00	2.8E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.9E-01	2.1E-04	2.9E-03	0.0E+00	3.1E-03	7.5E-03	1.1E-02	NA	--	NA	--
Cadmium	1.5E+01	1.5E-01	1.6E+01	0.0E+00	1.6E+01	2.9E-01	1.7E+01	1.9E+00	**8.7**	2.1E+01	<1
Chromium	1.1E+01	4.4E-03	5.3E-01	0.0E+00	5.4E-01	2.0E-01	7.4E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	2.0E+00	2.1E-03	3.9E-02	0.0E+00	4.1E-02	3.8E-02	7.9E-02	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+01	5.7E-01	2.7E+00	0.0E+00	3.3E+00	1.4E+00	4.7E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.1E+03	7.3E-01	3.9E+01	0.0E+00	3.9E+01	2.1E+01	6.0E+01	7.4E+00	**8.2**	3.7E+01	**1.6**
Manganese	9.2E+01	1.3E+00	1.6E+00	0.0E+00	2.9E+00	1.8E+00	4.6E+00	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+00	3.2E-02	2.3E-01	0.0E+00	2.7E-01	4.4E-02	3.1E-01	4.5E-01	<1	9.1E-01	<1
Nickel	7.2E+00	2.6E-02	1.2E+00	0.0E+00	1.3E+00	1.4E-01	1.4E+00	8.0E+01	<1	1.1E+02	<1
Selenium	3.9E+00	1.2E-01	4.1E-01	0.0E+00	5.4E-01	7.5E-02	6.1E-01	4.0E-01	**1.5**	8.0E-01	<1
Silver	3.7E+00	8.0E-02	1.2E+00	0.0E+00	1.3E+00	7.0E-02	1.4E+00	1.5E+01	<1	4.4E+01	<1
Thallium	4.5E-01	9.8E-05	7.3E-02	0.0E+00	7.3E-02	8.6E-03	8.2E-02	NA	--	NA	--
Vanadium	7.4E+00	2.2E-03	5.1E-02	0.0E+00	5.3E-02	1.4E-01	2.0E-01	1.1E+01	<1	5.7E+01	<1
Zinc	2.2E+03	2.0E+01	1.8E+02	0.0E+00	2.0E+02	4.2E+01	2.4E+02	1.5E+01	**16.5**	1.3E+02	**1.8**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-88
MAXIMUM EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	3.9E-01	9.1E+00	0.0E+00	9.5E+00	9.5E-01	1.0E+01	NA	--	NA	--
Arsenic	1.5E+02	2.0E-01	4.7E-01	0.0E+00	6.7E-01	9.0E-01	1.6E+00	5.5E+00	<1	2.2E+01	<1
Barium	2.1E+02	2.9E+00	1.2E+00	0.0E+00	4.1E+00	1.3E+00	5.4E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	1.8E-03	5.4E-03	0.0E+00	7.2E-03	1.2E-02	2.0E-02	NA	--	NA	--
Cadmium	8.1E+01	6.3E-01	1.8E+01	0.0E+00	1.8E+01	5.1E-01	1.9E+01	1.9E+00	**9.9**	2.1E+01	<1
Chromium	2.8E+01	1.9E-02	5.0E-01	0.0E+00	5.2E-01	1.7E-01	6.9E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.8E+00	1.0E-02	4.2E-02	0.0E+00	5.3E-02	3.6E-02	8.9E-02	7.6E+00	<1	3.8E+01	<1
Copper	3.6E+02	1.7E+00	1.5E+00	0.0E+00	3.3E+00	2.2E+00	5.5E+00	3.3E+01	<1	6.2E+01	<1
Lead	8.7E+03	3.8E+00	7.5E+01	0.0E+00	7.9E+01	5.4E+01	1.3E+02	7.4E+00	**18.0**	3.7E+01	**3.6**
Manganese	4.5E+02	1.0E+01	1.7E+00	0.0E+00	1.2E+01	2.8E+00	1.5E+01	9.8E+02	<1	4.9E+03	<1
Mercury	1.7E+01	1.5E-01	1.6E-01	0.0E+00	3.1E-01	1.0E-01	4.2E-01	4.5E-01	<1	9.1E-01	<1
Nickel	2.7E+01	1.1E-01	1.7E+00	0.0E+00	1.8E+00	1.7E-01	2.0E+00	8.0E+01	<1	1.1E+02	<1
Selenium	2.5E+01	1.5E+00	5.8E-01	0.0E+00	2.1E+00	1.5E-01	2.3E+00	4.0E-01	**5.7**	8.0E-01	**2.8**
Silver	2.7E+01	9.6E-01	3.3E+00	0.0E+00	4.2E+00	1.7E-01	4.4E+00	1.5E+01	<1	4.4E+01	<1
Thallium	4.4E-01	1.6E-04	2.6E-02	0.0E+00	2.7E-02	2.7E-03	2.9E-02	NA	--	NA	--
Vanadium	2.4E+01	1.2E-02	6.0E-02	0.0E+00	7.2E-02	1.5E-01	2.2E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	7.8E+01	1.1E+02	0.0E+00	1.9E+02	6.5E+01	2.5E+02	1.5E+01	**17.2**	1.3E+02	**1.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-89
MEAN EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	4.1E-02	8.2E-01	0.0E+00	8.6E-01	8.5E-02	9.5E-01	NA	--	NA	--
Arsenic	2.5E+01	7.4E-02	1.4E-01	0.0E+00	2.1E-01	1.5E-01	3.7E-01	5.5E+00	<1	2.2E+01	<1
Barium	6.6E+01	8.9E-01	3.6E-01	0.0E+00	1.3E+00	4.1E-01	1.7E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.9E-01	3.5E-04	1.0E-03	0.0E+00	1.4E-03	2.4E-03	3.8E-03	NA	--	NA	--
Cadmium	1.5E+01	2.5E-01	5.9E+00	0.0E+00	6.1E+00	9.5E-02	6.2E+00	1.9E+00	**3.3**	2.1E+01	<1
Chromium	1.1E+01	7.1E-03	1.9E-01	0.0E+00	2.0E-01	6.6E-02	2.7E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	2.0E+00	3.5E-03	1.4E-02	0.0E+00	1.8E-02	1.2E-02	3.0E-02	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+01	9.4E-01	1.0E+00	0.0E+00	1.9E+00	4.6E-01	2.4E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.1E+03	1.2E+00	1.4E+01	0.0E+00	1.5E+01	6.8E+00	2.2E+01	7.4E+00	**3.0**	3.7E+01	<1
Manganese	9.2E+01	2.1E+00	5.8E-01	0.0E+00	2.7E+00	5.8E-01	3.2E+00	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+00	5.2E-02	8.5E-02	0.0E+00	1.4E-01	1.4E-02	1.5E-01	4.5E-01	<1	9.1E-01	<1
Nickel	7.2E+00	4.3E-02	4.5E-01	0.0E+00	5.0E-01	4.5E-02	5.4E-01	8.0E+01	<1	1.1E+02	<1
Selenium	3.9E+00	2.0E-01	1.5E-01	0.0E+00	3.5E-01	2.4E-02	3.8E-01	4.0E-01	<1	8.0E-01	<1
Silver	3.7E+00	1.3E-01	4.5E-01	0.0E+00	5.8E-01	2.3E-02	6.0E-01	1.5E+01	<1	4.4E+01	<1
Thallium	4.5E-01	1.6E-04	2.7E-02	0.0E+00	2.7E-02	2.8E-03	3.0E-02	NA	--	NA	--
Vanadium	7.4E+00	3.7E-03	1.9E-02	0.0E+00	2.2E-02	4.6E-02	6.9E-02	1.1E+01	<1	5.7E+01	<1
Zinc	2.2E+03	3.2E+01	6.4E+01	0.0E+00	9.7E+01	1.4E+01	1.1E+02	1.5E+01	**7.6**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-90
MAXIMUM EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	0.0E+00	0.0E+00	2.4E-03	2.4E-03	0.0E+00	2.4E-03	NA	--	NA	--
Arsenic	1.5E+02	0.0E+00	0.0E+00	3.7E-02	3.7E-02	0.0E+00	3.7E-02	5.5E+00	<1	2.2E+01	<1
Barium	2.1E+02	0.0E+00	0.0E+00	9.6E-01	9.6E-01	0.0E+00	9.6E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	0.0E+00	0.0E+00	1.6E-06	1.6E-06	0.0E+00	1.6E-06	NA	--	NA	--
Cadmium	8.1E+01	0.0E+00	0.0E+00	2.1E-01	2.1E-01	0.0E+00	2.1E-01	1.9E+00	<1	2.1E+01	<1
Chromium	2.8E+01	0.0E+00	0.0E+00	2.1E-01	2.1E-01	0.0E+00	2.1E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.8E+00	0.0E+00	0.0E+00	9.5E-03	9.5E-03	0.0E+00	9.5E-03	7.6E+00	<1	3.8E+01	<1
Copper	3.6E+02	0.0E+00	0.0E+00	1.9E+00	1.9E+00	0.0E+00	1.9E+00	3.3E+01	<1	6.2E+01	<1
Lead	8.7E+03	0.0E+00	0.0E+00	4.7E+00	4.7E+00	0.0E+00	4.7E+00	7.4E+00	<1	3.7E+01	<1
Manganese	4.5E+02	0.0E+00	0.0E+00	3.6E-03	3.6E-03	0.0E+00	3.6E-03	9.8E+02	<1	4.9E+03	<1
Mercury	1.7E+01	0.0E+00	0.0E+00	7.1E-02	7.1E-02	0.0E+00	7.1E-02	4.5E-01	<1	9.1E-01	<1
Nickel	2.7E+01	0.0E+00	0.0E+00	2.9E-01	2.9E-01	0.0E+00	2.9E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.5E+01	0.0E+00	0.0E+00	1.8E-01	1.8E-01	0.0E+00	1.8E-01	4.0E-01	<1	8.0E-01	<1
Silver	2.7E+01	0.0E+00	0.0E+00	2.5E-03	2.5E-03	0.0E+00	2.5E-03	1.5E+01	<1	4.4E+01	<1
Thallium	4.4E-01	0.0E+00	0.0E+00	3.9E-03	3.9E-03	0.0E+00	3.9E-03	NA	--	NA	--
Vanadium	2.4E+01	0.0E+00	0.0E+00	2.6E-05	2.6E-05	0.0E+00	2.6E-05	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	0.0E+00	0.0E+00	1.4E+01	1.4E+01	0.0E+00	1.4E+01	1.5E+01	<1	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-91
MEAN EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	0.0E+00	0.0E+00	2.2E-04	2.2E-04	0.0E+00	2.2E-04	NA	--	NA	--
Arsenic	2.5E+01	0.0E+00	0.0E+00	8.7E-03	8.7E-03	0.0E+00	8.7E-03	5.5E+00	<1	2.2E+01	<1
Barium	6.6E+01	0.0E+00	0.0E+00	3.0E-01	3.0E-01	0.0E+00	3.0E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	3.9E-01	0.0E+00	0.0E+00	3.1E-07	3.1E-07	0.0E+00	3.1E-07	NA	--	NA	--
Cadmium	1.5E+01	0.0E+00	0.0E+00	8.0E-02	8.0E-02	0.0E+00	8.0E-02	1.9E+00	<1	2.1E+01	<1
Chromium	1.1E+01	0.0E+00	0.0E+00	1.0E-01	1.0E-01	0.0E+00	1.0E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	2.0E+00	0.0E+00	0.0E+00	3.2E-03	3.2E-03	0.0E+00	3.2E-03	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+01	0.0E+00	0.0E+00	1.4E+00	1.4E+00	0.0E+00	1.4E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.1E+03	0.0E+00	0.0E+00	1.6E+00	1.6E+00	0.0E+00	1.6E+00	7.4E+00	<1	3.7E+01	<1
Manganese	9.2E+01	0.0E+00	0.0E+00	7.3E-04	7.3E-04	0.0E+00	7.3E-04	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+00	0.0E+00	0.0E+00	9.9E-03	9.9E-03	0.0E+00	9.9E-03	4.5E-01	<1	9.1E-01	<1
Nickel	7.2E+00	0.0E+00	0.0E+00	1.6E-01	1.6E-01	0.0E+00	1.6E-01	8.0E+01	<1	1.1E+02	<1
Selenium	3.9E+00	0.0E+00	0.0E+00	8.8E-02	8.8E-02	0.0E+00	8.8E-02	4.0E-01	<1	8.0E-01	<1
Silver	3.7E+00	0.0E+00	0.0E+00	3.5E-04	3.5E-04	0.0E+00	3.5E-04	1.5E+01	<1	4.4E+01	<1
Thallium	4.5E-01	0.0E+00	0.0E+00	4.0E-03	4.0E-03	0.0E+00	4.0E-03	NA	--	NA	--
Vanadium	7.4E+00	0.0E+00	0.0E+00	8.1E-06	8.1E-06	0.0E+00	8.1E-06	1.1E+01	<1	5.7E+01	<1
Zinc	2.2E+03	0.0E+00	0.0E+00	1.2E+01	1.2E+01	0.0E+00	1.2E+01	1.5E+01	<1	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-92
MAXIMUM EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE WITHOUT RNOF05 (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	3.8E-01	0.0E+00	0.0E+00	3.8E-01	2.8E-01	6.6E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.3E+02	2.1E-01	0.0E+00	0.0E+00	2.1E-01	4.4E-01	6.5E-01	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	1.9E+00	0.0E+00	0.0E+00	1.9E+00	2.5E-01	2.2E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	1.0E-03	0.0E+00	0.0E+00	1.0E-03	2.0E-03	3.0E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	2.9E+00	0.0E+00	0.0E+00	2.9E+00	3.7E+00	6.6E+00	5.1E+00	**1.3**	7.1E+00	<1
Chromium	4.2E+01	1.6E-02	0.0E+00	0.0E+00	1.6E-02	4.3E-02	5 9E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	5.2E-02	0.0E+00	0.0E+00	5.2E-02	5.2E-02	1.0E-01	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	2.6E+00	0.0E+00	0.0E+00	2.6E+00	4.5E+00	7.2E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	9.6E+00	0.0E+00	0.0E+00	9.6E+00	1.3E+02	1.4E+02	3.4E+01	**4.0**	8.0E+01	**1.7**
Manganese	5.7E+03	7.2E+01	0.0E+00	0.0E+00	7.2E+01	5.8E+00	7.8E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	2.8E-01	0.0E+00	0.0E+00	2.8E-01	1.5E-01	4.3E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	6.5E-02	0.0E+00	0.0E+00	6.5E-02	2.7E-02	9.2E-02	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	3.5E+00	0.0E+00	0.0E+00	3.5E+00	8.8E-02	3.6E+00	3.5E-01	**10.2**	1.1E+00	**3.4**
Silver	4.1E+02	8.2E+00	0.0E+00	0.0E+00	8.2E+00	4.1E-01	8.6E+00	4.4E+01	<1	2.2E+02	<1
Thallium	3.1E+00	6.3E-04	0.0E+00	0.0E+00	6.3E-04	3.1E-03	3.8E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	8.3E-03	0.0E+00	0.0E+00	8.3E-03	3.0E-02	3.9E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	1.6E+02	0.0E+00	0.0E+00	1.6E+02	1.1E+02	2.7E+02	1.6E+02	**1.7**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-93
MEAN EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE WITHOUT RNOF05 (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.6E+01	4.2E-02	0.0E+00	0.0E+00	4.2E-02	2.6E-02	6.8E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	3.8E+01	5.3E-02	0.0E+00	0.0E+00	5.3E-02	3.9E-02	9.2E-02	5.7E+00	<1	1.2E+01	<1
Barium	6.3E+01	4.8E-01	0.0E+00	0.0E+00	4.8E-01	6.4E-02	5.4E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.1E-01	1.6E-04	0.0E+00	0.0E+00	1.6E-04	3.2E-04	4.8E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	1.3E+02	4.6E-01	0.0E+00	0.0E+00	4.6E-01	1.3E-01	5.9E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.2E+01	4.5E-03	0.0E+00	0.0E+00	4.5E-03	1.2E-02	1.7E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	4.5E+00	4.6E-03	0.0E+00	0.0E+00	4.6E-03	4.6E-03	9.2E-03	7.3E+00	<1	3.7E+01	<1
Copper	2.2E+02	8.1E-01	0.0E+00	0.0E+00	8.1E-01	2.2E-01	1.0E+00	1.2E+01	<1	1.5E+01	<1
Lead	4.6E+03	1.5E+00	0.0E+00	0.0E+00	1.5E+00	4.7E+00	6.2E+00	3.4E+01	<1	8.0E+01	<1
Manganese	3.4E+02	4.3E+00	0.0E+00	0.0E+00	4.3E+00	3.5E-01	4.7E+00	8.8E+01	<1	2.8E+02	<1
Mercury	8.1E+00	5.8E-02	0.0E+00	0.0E+00	5.8E-02	8.2E-03	6.6E-02	1.3E+01	<1	5.6E+01	<1
Nickel	7.1E+00	2.4E-02	0.0E+00	0.0E+00	2.4E-02	7.2E-03	3.1E-02	6.0E+01	<1	8.0E+01	<1
Selenium	7.0E+00	2.2E-01	0.0E+00	0.0E+00	2.2E-01	7.1E-03	2.3E-01	3.5E-01	<1	1.1E+00	<1
Silver	1.5E+01	3.1E-01	0.0E+00	0.0E+00	3.1E-01	1.6E-02	3.3E-01	4.4E+01	<1	2.2E+02	<1
Thallium	4.7E-01	9.6E-05	0.0E+00	0.0E+00	9.6E-05	4.8E-04	5.8E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	8.7E+00	2.4E-03	0.0E+00	0.0E+00	2.4E-03	8.8E-03	1.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	6.0E+03	3.2E+01	0.0E+00	0.0E+00	3.2E+01	6.1E+00	3.8E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-94
MAXIMUM EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	6.4E-02	0.0E+00	0.0E+00	6.4E-02	4.5E-02	1.1E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.5E+02	3.3E-02	0.0E+00	0.0E+00	3.3E-02	4.3E-02	7.5E-02	5.7E+00	<1	1.2E+01	<1
Barium	2.1E+02	4.7E-01	0.0E+00	0.0E+00	4.7E-01	6.3E-02	5.3E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	2.9E-04	0.0E+00	0.0E+00	2.9E-04	5.8E-04	8.8E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	8.1E+01	1.0E-01	0.0E+00	0.0E+00	1.0E-01	2.4E-02	1.3E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.8E+01	3.0E-03	0.0E+00	0.0E+00	3.0E-03	8.1E-03	1.1E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.8E+00	1.7E-03	0.0E+00	0.0E+00	1.7E-03	1.7E-03	3.4E-03	7.3E+00	<1	3.7E+01	<1
Copper	3.6E+02	2.8E-01	0.0E+00	0.0E+00	2.8E-01	1.1E-01	3.9E-01	1.2E+01	<1	1.5E+01	<1
Lead	8.7E+03	6.2E-01	0.0E+00	0.0E+00	6.2E-01	2.5E+00	3.2E+00	3.4E+01	<1	8.0E+01	<1
Manganese	4.5E+02	1.6E+00	0.0E+00	0.0E+00	1.6E+00	1.3E-01	1.8E+00	8.8E+01	<1	2.8E+02	<1
Mercury	1.7E+01	2.5E-02	0.0E+00	0.0E+00	2.5E-02	4.8E-03	2.9E-02	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	1.9E-02	0.0E+00	0.0E+00	1.9E-02	7.8E-03	2.7E-02	6.0E+01	<1	8.0E+01	<1
Selenium	2.5E+01	2.5E-01	0.0E+00	0.0E+00	2.5E-01	7.2E-03	2.6E-01	3.5E-01	<1	1.1E+00	<1
Silver	2.7E+01	1.6E-01	0.0E+00	0.0E+00	1.6E-01	7.8E-03	1.6E-01	4.4E+01	<1	2.2E+02	<1
Thallium	4.4E-01	2.6E-05	0.0E+00	0.0E+00	2.6E-05	1.3E-04	1.5E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	2.4E+01	1.9E-03	0.0E+00	0.0E+00	1.9E-03	7.0E-03	8.9E-03	5.9E+00	<1	8.3E+00	<1
Zinc	1.0E+04	1.3E+01	0.0E+00	0.0E+00	1.3E+01	3.0E+00	1.6E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-95
MEAN EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	6.7E-03	0.0E+00	0.0E+00	6.7E-03	4.0E-03	1.1E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	2.5E+01	1.2E-02	0.0E+00	0.0E+00	1.2E-02	7.3E-03	1.9E-02	5.7E+00	<1	1.2E+01	<1
Barium	6.6E+01	1.5E-01	0.0E+00	0.0E+00	1.5E-01	1.9E-02	1.7E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.9E-01	5.7E-05	0.0E+00	0.0E+00	5.7E-05	1.1E-04	1.7E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	1.5E+01	4.1E-02	0.0E+00	0.0E+00	4.1E-02	4.5E-03	4.5E-02	5.1E+00	<1	7.1E+00	<1
Chromium	1.1E+01	1.2E-03	0.0E+00	0.0E+00	1.2E-03	3.1E-03	4.3E-03	7.4E+00	<1	3.7E+01	<1
Cobalt	2.0E+00	5.7E-04	0.0E+00	0.0E+00	5.7E-04	5.7E-04	1.1E-03	7.3E+00	<1	3.7E+01	<1
Copper	7.4E+01	1.5E-01	0.0E+00	0.0E+00	1.5E-01	2.2E-02	1.8E-01	1.2E+01	<1	1.5E+01	<1
Lead	1.1E+03	2.0E-01	0.0E+00	0.0E+00	2.0E-01	3.2E-01	5.2E-01	3.4E+01	<1	8.0E+01	<1
Manganese	9.2E+01	3.4E-01	0.0E+00	0.0E+00	3.4E-01	2.7E-02	3.7E-01	8.8E+01	<1	2.8E+02	<1
Mercury	2.3E+00	8.5E-03	0.0E+00	0.0E+00	8.5E-03	6.8E-04	9.1E-03	1.3E+01	<1	5.6E+01	<1
Nickel	7.2E+00	7.0E-03	0.0E+00	0.0E+00	7.0E-03	2.1E-03	9.1E-03	6.0E+01	<1	8.0E+01	<1
Selenium	3.9E+00	3.3E-02	0.0E+00	0.0E+00	3.3E-02	1.1E-03	3.4E-02	3.5E-01	<1	1.1E+00	<1
Silver	3.7E+00	2.1E-02	0.0E+00	0.0E+00	2.1E-02	1.1E-03	2.2E-02	4.4E+01	<1	2.2E+02	<1
Thallium	4.5E-01	2.6E-05	0.0E+00	0.0E+00	2.6E-05	1.3E-04	1.6E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	7.4E+00	6.0E-04	0.0E+00	0.0E+00	6.0E-04	2.2E-03	2.8E-03	5.9E+00	<1	8.3E+00	<1
Zinc	2.2E+03	5.3E+00	0.0E+00	0.0E+00	5.3E+00	6.4E-01	5.9E+00	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

TABLE F-96
MAXIMUM EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	4.9E-01	1.7E+01	0.0E+00	1.8E+01	8.2E-01	1.8E+01	1.3E+01	**1.4**	6.7E+01	<1
Arsenic	1.5E+02	2.5E-01	8.8E-01	0.0E+00	1.1E+00	7.8E-01	1.9E+00	5.7E+00	<1	1.2E+01	<1
Barium	2.1E+02	3.6E+00	2.2E+00	0.0E+00	5.8E+00	1.2E+00	6.9E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	2.2E-03	1.0E-02	0.0E+00	1.2E-02	1.1E-02	2.3E-02	5.3E-01	<1	2.7E+00	<1
Cadmium	8.1E+01	7.8E-01	3.3E+01	0.0E+00	3.4E+01	4.4E-01	3.4E+01	5.1E+00	**6.7**	7.1E+00	**4.8**
Chromium	2.8E+01	2.3E-02	9.4E-01	0.0E+00	9.7E-01	1.5E-01	1.1E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5.8E+00	1.3E-02	7.9E-02	0.0E+00	9.2E-02	3.1E-02	1.2E-01	7.3E+00	<1	3.7E+01	<1
Copper	3.6E+02	2.2E+00	2.8E+00	0.0E+00	5.0E+00	1.9E+00	6.9E+00	1.2E+01	<1	1.5E+01	<1
Lead	8.7E+03	4.7E+00	1.4E+02	0.0E+00	1.5E+02	4.7E+01	1.9E+02	3.4E+01	**5.6**	8.0E+01	**2.4**
Manganese	4.5E+02	1.3E+01	3.2E+00	0.0E+00	1.6E+01	2.4E+00	1.8E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.7E+01	1.9E-01	3.1E-01	0.0E+00	4.9E-01	8.9E-02	5.8E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	1.4E-01	3.2E+00	0.0E+00	3.3E+00	1.4E-01	3.5E+00	6.0E+01	<1	8.0E+01	<1
Selenium	2.5E+01	1.9E+00	1.1E+00	0.0E+00	3.0E+00	1.3E-01	3.1E+00	3.5E-01	**9.0**	1.1E+00	**3.0**
Silver	2.7E+01	1.2E+00	6.1E+00	0.0E+00	7.3E+00	1.4E-01	7.5E+00	4.4E+01	<1	2.2E+02	<1
Thallium	4.4E-01	2.0E-04	4.9E-02	0.0E+00	5.0E-02	2.4E-03	5.2E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	2.4E+01	1.5E-02	1.1E-01	0.0E+00	1.3E-01	1.3E-01	2.6E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.0E+04	9.7E+01	2.0E+02	0.0E+00	3.0E+02	5.6E+01	3.5E+02	1.6E+02	**2.2**	3.2E+02	**1.1**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-97
MEAN EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	5.1E-02	1.5E+00	0.0E+00	1.6E+00	7.4E-02	1.7E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	2.5E+01	9.2E-02	2.6E-01	0.0E+00	3.5E-01	1.3E-01	4.8E-01	5.7E+00	<1	1.2E+01	<1
Barium	6.6E+01	1.1E+00	6.8E-01	0.0E+00	1.8E+00	3.6E-01	2.1E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.9E-01	4.3E-04	2.0E-03	0.0E+00	2.4E-03	2.1E-03	4.5E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	1.5E+01	3.1E-01	1.1E+01	0.0E+00	1.1E+01	8.2E-02	1.1E+01	5.1E+00	**2.2**	7.1E+00	**1.6**
Chromium	1.1E+01	8.9E-03	3.6E-01	0.0E+00	3.7E-01	5.7E-02	4.3E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	2.0E+00	4.4E-03	2.7E-02	0.0E+00	3.1E-02	1.0E-02	4.2E-02	7.3E+00	<1	3.7E+01	<1
Copper	7.4E+01	1.2E+00	1.9E+00	0.0E+00	3.0E+00	4.0E-01	3.4E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.1E+03	1.5E+00	2.6E+01	0.0E+00	2.8E+01	5.9E+00	3.4E+01	3.4E+01	<1	8.0E+01	<1
Manganese	9.2E+01	2.6E+00	1.1E+00	0.0E+00	3.7E+00	5.0E-01	4.2E+00	8.8E+01	<1	2.8E+02	<1
Mercury	2.3E+00	6.5E-02	1.6E-01	0.0E+00	2.2E-01	1.2E-02	2.4E-01	1.3E+01	<1	5.6E+01	<1
Nickel	7.2E+00	5.3E-02	8.5E-01	0.0E+00	9.0E-01	3.8E-02	9.4E-01	6.0E+01	<1	8.0E+01	<1
Selenium	3.9E+00	2.5E-01	2.8E-01	0.0E+00	5.3E-01	2.1E-02	5.6E-01	3.5E-01	**1.6**	1.1E+00	<1
Silver	3.7E+00	1.6E-01	8.4E-01	0.0E+00	1.0E+00	2.0E-02	1.0E+00	4.4E+01	<1	2.2E+02	<1
Thallium	4.5E-01	2.0E-04	5.0E-02	0.0E+00	5.0E-02	2.4E-03	5.3E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	7.4E+00	4.6E-03	3.5E-02	0.0E+00	3.9E-02	4.0E-02	7.9E-02	5.9E+00	<1	8.3E+00	<1
Zinc	2.2E+03	4.0E+01	1.2E+02	0.0E+00	1.6E+02	1.2E+01	1.7E+02	1.6E+02	**1.1**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-98
MAXIMUM EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE WITHOUT RNOF05 (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	0.0E+00	3.7E+01	0.0E+00	3.7E+01	4.8E+00	4.1E+01	1.3E+01	**3.1**	6.7E+01	<1
Arsenic	4.3E+02	0.0E+00	2.3E+00	0.0E+00	2.3E+00	7.5E+00	9.8E+00	5.7E+00	**1.7**	1.2E+01	<1
Barium	2.5E+02	0.0E+00	3.0E+00	0.0E+00	3.0E+00	4.4E+00	7.4E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	0.0E+00	1.2E-02	0.0E+00	1.2E-02	3.5E-02	4.7E-02	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	0.0E+00	4.9E+02	0.0E+00	4.9E+02	6.4E+01	5.5E+02	5.1E+00	**108.3**	7.1E+00	**77.8**
Chromium	4.2E+01	0.0E+00	1.7E+00	0.0E+00	1.7E+00	7.4E-01	2.5E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	0.0E+00	8.3E-01	0.0E+00	8.3E-01	8.9E-01	1.7E+00	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	0.0E+00	6.6E+00	0.0E+00	6.6E+00	7.8E+01	8.4E+01	1.2E+01	**7.2**	1.5E+01	**5.6**
Lead	1.2E+05	0.0E+00	1.5E+03	0.0E+00	1.5E+03	2.2E+03	3.6E+03	3.4E+01	**106.2**	8.0E+01	**45.1**
Manganese	5.7E+03	0.0E+00	2.2E+01	0.0E+00	2.2E+01	9.9E+01	1.2E+02	8.8E+01	**1.4**	2.8E+02	<1
Mercury	1.5E+02	0.0E+00	7.5E-01	0.0E+00	7.5E-01	2.6E+00	3.3E+00	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	0.0E+00	3.8E+00	0.0E+00	3.8E+00	4.7E-01	4.3E+00	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	0.0E+00	3.2E+00	0.0E+00	3.2E+00	1.5E+00	4.7E+00	3.5E-01	**13.5**	1.1E+00	**4.5**
Silver	4.1E+02	0.0E+00	1.1E+02	0.0E+00	1.1E+02	7.1E+00	1.2E+02	4.4E+01	**2.7**	2.2E+02	<1
Thallium	3.1E+00	0.0E+00	4.1E-01	0.0E+00	4.1E-01	5.4E-02	4.7E-01	2.0E-01	**2.3**	1.0E+00	<1
Vanadium	3.0E+01	0.0E+00	1.7E-01	0.0E+00	1.7E-01	5.2E-01	6.9E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	0.0E+00	5.2E+02	0.0E+00	5.2E+02	1.8E+03	2.3E+03	1.6E+02	**14.7**	3.2E+02	**7.3**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-99
MEAN EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.6E+01	0.0E+00	3.4E+00	0.0E+00	3.4E+00	4.5E-01	3.9E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	3.8E+01	0.0E+00	4.1E-01	0.0E+00	4.1E-01	6.6E-01	1.1E+00	5.7E+00	<1	1.2E+01	<1
Barium	6.3E+01	0.0E+00	7.6E-01	0.0E+00	7.6E-01	1.1E+00	1.9E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.1E-01	0.0E+00	1.9E-03	0.0E+00	1.9E-03	5.5E-03	7.4E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	1.3E+02	0.0E+00	5.4E+01	0.0E+00	5.4E+01	2.3E+00	5.6E+01	5.1E+00	**11.1**	7.1E+00	**7.9**
Chromium	1.2E+01	0.0E+00	4.9E-01	0.0E+00	4.9E-01	2.1E-01	6.9E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	4.5E+00	0.0E+00	7.4E-02	0.0E+00	7.4E-02	7.9E-02	1.5E-01	7.3E+00	<1	3.7E+01	<1
Copper	2.2E+02	0.0E+00	3.0E+00	0.0E+00	3.0E+00	3.8E+00	6.7E+00	1.2E+01	<1	1.5E+01	<1
Lead	4.6E+03	0.0E+00	1.0E+02	0.0E+00	1.0E+02	8.0E+01	1.8E+02	3.4E+01	**5.3**	8.0E+01	**2.3**
Manganese	3.4E+02	0.0E+00	3.2E+00	0.0E+00	3.2E+00	5.9E+00	9.1E+00	8.8E+01	<1	2.8E+02	<1
Mercury	8.1E+00	0.0E+00	2.9E-01	0.0E+00	2.9E-01	1.4E-01	4.3E-01	1.3E+01	<1	5.6E+01	<1
Nickel	7.1E+00	0.0E+00	1.0E+00	0.0E+00	1.0E+00	1.2E-01	1.1E+00	6.0E+01	<1	8.0E+01	<1
Selenium	7.0E+00	0.0E+00	5.2E-01	0.0E+00	5.2E-01	1.2E-01	6.4E-01	3.5E-01	**1.8**	1.1E+00	<1
Silver	1.5E+01	0.0E+00	4.2E+00	0.0E+00	4.2E+00	2.7E-01	4.5E+00	4.4E+01	<1	2.2E+02	<1
Thallium	4.7E-01	0.0E+00	6.4E-02	0.0E+00	6.4E-02	8.3E-03	7.2E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	8.7E+00	0.0E+00	4.9E-02	0.0E+00	4.9E-02	1.5E-01	2.0E-01	5.9E+00	<1	8.3E+00	<1
Zinc	6.0E+03	0.0E+00	2.0E+02	0.0E+00	2.0E+02	1.0E+02	3.1E+02	1.6E+02	**1.9**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-100
MAXIMUM EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.5E+02	1.4E-02	0.0E+00	8.9E-04	1.5E-02	1.4E-01	1.5E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.5E+02	7.2E-03	0.0E+00	1.4E-02	2.1E-02	1.3E-01	1.5E-01	5.7E+00	<1	1.2E+01	<1
Barium	2.1E+02	1.0E-01	0.0E+00	3.5E-01	4.6E-01	1.9E-01	6.5E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	6.5E-05	0.0E+00	5.8E-07	6.5E-05	1.8E-03	1.9E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	8.1E+01	2.3E-02	0.0E+00	7.6E-02	9.8E-02	7.4E-02	1.7E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.8E+01	6.7E-04	0.0E+00	7.7E-02	7.8E-02	2.5E-02	1.0E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	5.8E+00	3.8E-04	0.0E+00	3.5E-03	3.9E-03	5.3E-03	9.1E-03	7.3E+00	<1	3.7E+01	<1
Copper	3.6E+02	6.3E-02	0.0E+00	6.8E-01	7.5E-01	3.3E-01	1.1E+00	1.2E+01	<1	1.5E+01	<1
Lead	8.7E+03	1.4E-01	0.0E+00	1.7E+00	1.9E+00	7.9E+00	9.7E+00	3.4E+01	<1	8.0E+01	<1
Manganese	4.5E+02	3.6E-01	0.0E+00	1.3E-03	3.6E-01	4.1E-01	7.7E-01	8.8E+01	<1	2.8E+02	<1
Mercury	1.7E+01	5.4E-03	0.0E+00	2.6E-02	3.2E-02	1.5E-02	4.7E-02	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	4.1E-03	0.0E+00	1.1E-01	1.1E-01	2.4E-02	1.3E-01	6.0E+01	<1	8.0E+01	<1
Selenium	2.5E+01	5.6E-02	0.0E+00	6.4E-02	1.2E-01	2.2E-02	1.4E-01	3.5E-01	<1	1.1E+00	<1
Silver	2.7E+01	3.5E-02	0.0E+00	9.4E-04	3.6E-02	2.4E-02	6.0E-02	4.4E+01	<1	2.2E+02	<1
Thallium	4.4E-01	5.7E-06	0.0E+00	1.4E-03	1.5E-03	4.0E-04	1.9E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	2.4E+01	4.3E-04	0.0E+00	9.6E-06	4.4E-04	2.2E-02	2.2E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.0E+04	2.8E+00	0.0E+00	5.1E+00	7.9E+00	9.5E+00	1.7E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-101
MEAN EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE WITHOUT RNOF05
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	1.4E+01	1.5E-03	0.0E+00	8.0E-05	1.6E-03	1.2E-02	1.4E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	2.5E+01	2.7E-03	0.0E+00	3.2E-03	5.9E-03	2.3E-02	2.8E-02	5.7E+00	<1	1.2E+01	<1
Barium	6.6E+01	3.2E-02	0.0E+00	1.1E-01	1.4E-01	6.0E-02	2.0E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.9E-01	1.3E-05	0.0E+00	1.1E-07	1.3E-05	3.5E-04	3.6E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	1 5E+01	9.0E-03	0.0E+00	2.9E-02	3.8E-02	1.4E-02	5.2E-02	5.1E+00	<1	7.1E+00	<1
Chromium	1 1E+01	2.6E-04	0.0E+00	3.8E-02	3.9E-02	9.6E-03	4.8E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	2.0E+00	1.3E-04	0.0E+00	1.2E-03	1.3E-03	1.8E-03	3.1E-03	7.3E+00	<1	3.7E+01	<1
Copper	7.4E+01	3.4E-02	0.0E+00	5.2E-01	5.5E-01	6.8E-02	6.2E-01	1.2E+01	<1	1.5E+01	<1
Lead	1.1E+03	4.3E-02	0.0E+00	6.0E-01	6.4E-01	1.0E+00	1.6E+00	3.4E+01	<1	8.0E+01	<1
Manganese	9.2E+01	7.5E-02	0.0E+00	2.7E-04	7.5E-02	8.4E-02	1.6E-01	8.8E+01	<1	2.8E+02	<1
Mercury	2.3E+00	1.9E-03	0.0E+00	3.7E-03	5.5E-03	2.1E-03	7.6E-03	1.3E+01	<1	5.6E+01	<1
Nickel	7.2E+00	1.5E-03	0.0E+00	5.7E-02	5.9E-02	6.5E-03	6.5E-02	6.0E+01	<1	8.0E+01	<1
Selenium	3.9E+00	7.3E-03	0.0E+00	3.2E-02	4.0E-02	3.5E-03	4.3E-02	3.5E-01	<1	1.1E+00	<1
Silver	3.7E+00	4.7E-03	0.0E+00	1.3E-04	4.9E-03	3.3E-03	8.2E-03	4.4E+01	<1	2.2E+02	<1
Thallium	4.5E-01	5.8E-06	0.0E+00	1.5E-03	1.5E-03	4.1E-04	1.9E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	7.4E+00	1.3E-04	0.0E+00	3.0E-06	1.4E-04	6.7E-03	6.9E-03	5.9E+00	<1	8.3E+00	<1
Zinc	2.2E+03	1.2E+00	0.0E+00	4.5E+00	5.7E+00	2.0E+00	7.7E+00	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

TABLE F-102
MAXIMUM EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	2.2E-01	0.0E+00	0.0E+00	2.2E-01	6.5E-01	8.7E-01	NA	--	NA	--
Arsenic	4.3E+02	1.3E-01	0.0E+00	0.0E+00	1.3E-01	1.1E+00	1.3E+00	5.5E+00	<1	2.2E+01	<1
Barium	2.5E+02	1.2E+00	0.0E+00	0.0E+00	1.2E+00	6.5E-01	1.8E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	6.3E-04	0.0E+00	0.0E+00	6.3E-04	5.2E-03	5.8E-03	NA	--	NA	--
Cadmium	3.7E+03	1.8E+00	0.0E+00	0.0E+00	1.8E+00	9.5E+00	1.1E+01	1.9E+00	**6.0**	2.1E+01	<1
Chromium	4.2E+01	1.0E-02	0.0E+00	0.0E+00	1.0E-02	1.1E-01	1.2E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	3.2E-02	0.0E+00	0.0E+00	3.2E-02	1.3E-01	1.6E-01	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	1.6E+00	0.0E+00	0.0E+00	1.6E+00	1.2E+01	1.3E+01	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+05	6.0E+00	0.0E+00	0.0E+00	6.0E+00	3.2E+02	3.3E+02	7.4E+00	**44.4**	3.7E+01	**8.9**
Manganese	5.7E+03	4.5E+01	0.0E+00	0.0E+00	4.5E+01	1.5E+01	6.0E+01	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	1.7E-01	0.0E+00	0.0E+00	1.7E-01	3.8E-01	5.6E-01	4.5E-01	**1.2**	9.1E-01	<1
Nickel	2.7E+01	4.1E-02	0.0E+00	0.0E+00	4.1E-02	7.0E-02	1.1E-01	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	2.2E+00	0.0E+00	0.0E+00	2.2E+00	2.2E-01	2.4E+00	4.0E-01	**6.0**	8.0E-01	**3.0**
Silver	4.1E+02	5.1E+00	0.0E+00	0.0E+00	5.1E+00	1.1E+00	6.2E+00	1.5E+01	<1	4.4E+01	<1
Thallium	1.1E+00	1.4E-04	0.0E+00	0.0E+00	1.4E-04	2.9E-03	3.0E-03	NA	--	NA	--
Vanadium	3.0E+01	5.2E-03	0.0E+00	0.0E+00	5.2E-03	7.8E-02	8.3E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	1.0E+02	0.0E+00	0.0E+00	1.0E+02	2.7E+02	3.7E+02	1.5E+01	**25.8**	1.3E+02	**2.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-103
MEAN EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	3.8E-02	0.0E+00	0.0E+00	3.8E-02	9.8E-02	1.4E-01	NA	--	NA	--
Arsenic	7.3E+01	4.8E-02	0.0E+00	0.0E+00	4.8E-02	1.9E-01	2.4E-01	5.5E+00	<1	2.2E+01	<1
Barium	1.1E+02	5.4E-01	0.0E+00	0.0E+00	5.4E-01	2.9E-01	8.3E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	5.0E-01	1.6E-04	0.0E+00	0.0E+00	1.6E-04	1.3E-03	1.5E-03	NA	--	NA	--
Cadmium	5.4E+02	6.2E-01	0.0E+00	0.0E+00	6.2E-01	1.4E+00	2.0E+00	1.9E+00	**1.1**	2.1E+01	<1
Chromium	1.4E+01	3.4E-03	0.0E+00	0.0E+00	3.4E-03	3.7E-02	4.0E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	9.5E+00	6.0E-03	0.0E+00	0.0E+00	6.0E-03	2.5E-02	3.1E-02	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+02	8.2E-01	0.0E+00	0.0E+00	8.2E-01	1.9E+00	2.7E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.8E+04	2.1E+00	0.0E+00	0.0E+00	2.1E+00	4.8E+01	5.0E+01	7.4E+00	**6.8**	3.7E+01	**1.4**
Manganese	9.4E+02	7.4E+00	0.0E+00	0.0E+00	7.4E+00	2.4E+00	9.9E+00	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+01	6.4E-02	0.0E+00	0.0E+00	6.4E-02	6.1E-02	1.3E-01	4.5E-01	<1	9.1E-01	<1
Nickel	1.1E+01	2.1E-02	0.0E+00	0.0E+00	2.1E-02	2.9E-02	5.0E-02	8.0E+01	<1	1.1E+02	<1
Selenium	1.7E+01	3.5E-01	0.0E+00	0.0E+00	3.5E-01	4.3E-02	4.0E-01	4.0E-01	<1	8.0E-01	<1
Silver	6.1E+01	7.8E-01	0.0E+00	0.0E+00	7.8E-01	1.6E-01	9.3E-01	1.5E+01	<1	4.4E+01	<1
Thallium	3.2E-01	4.0E-05	0.0E+00	0.0E+00	4.0E-05	8.2E-04	8.6E-04	NA	--	NA	--
Vanadium	1.3E+01	2.2E-03	0.0E+00	0.0E+00	2.2E-03	3.4E-02	3.6E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	3.7E+01	0.0E+00	0.0E+00	3.7E+01	4.7E+01	8.5E+01	1.5E+01	**5.8**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-104
MAXIMUM EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	3.8E-01	4.1E+01	0.0E+00	4.1E+01	4.8E+00	4.6E+01	NA	--	NA	--
Arsenic	4.3E+02	2.2E-01	2.8E+00	0.0E+00	3.0E+00	8.4E+00	1.1E+01	5.5E+00	**2.1**	2.2E+01	<1
Barium	2.5E+02	2.1E+00	3.7E+00	0.0E+00	5.8E+00	4.8E+00	1.1E+01	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	1.1E-03	1.5E-02	0.0E+00	1.6E-02	3.8E-02	5.4E-02	NA	--	NA	--
Cadmium	3.7E+03	3.1E+00	6.0E+02	0.0E+00	6.0E+02	7.1E+01	6.7E+02	1.9E+00	**354.3**	2.1E+01	**31.9**
Chromium	4.2E+01	1.7E-02	2.1E+00	0.0E+00	2.1E+00	8.2E-01	3.0E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	5.6E-02	1.0E+00	0.0E+00	1.1E+00	9.8E-01	2.1E+00	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	2.8E+00	8.1E+00	0.0E+00	1.1E+01	8.6E+01	9.7E+01	3.3E+01	**2.9**	6.2E+01	**1.6**
Lead	1.2E+05	1.0E+01	1.8E+03	0.0E+00	1.8E+03	2.4E+03	4.2E+03	7.4E+00	**565.1**	3.7E+01	**113.0**
Manganese	5.7E+03	7.8E+01	2.6E+01	0.0E+00	1.0E+02	1.1E+02	2.1E+02	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	3.0E-01	9.2E-01	0.0E+00	1.2E+00	2.8E+00	4.1E+00	4.5E-01	**9.0**	9.1E-01	**4.5**
Nickel	2.7E+01	7.0E-02	4.6E+00	0.0E+00	4.7E+00	5.1E-01	5.2E+00	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	3.7E+00	3.9E+00	0.0E+00	7.7E+00	1.7E+00	9.4E+00	4.0E-01	**23.4**	8.0E-01	**11.7**
Silver	4.1E+02	8.9E+00	1.4E+02	0.0E+00	1.5E+02	7.8E+00	1.5E+02	1.5E+01	**10.5**	4.4E+01	**3.5**
Thallium	1.1E+00	2.4E-04	1.8E-01	0.0E+00	1.8E-01	2.1E-02	2.0E-01	NA	--	NA	--
Vanadium	3.0E+01	9.0E-03	2.1E-01	0.0E+00	2.1E-01	5.7E-01	7.9E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	1.7E+02	6.3E+02	0.0E+00	8.1E+02	2.0E+03	2.8E+03	1.5E+01	**195.2**	1.3E+02	**21.6**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-105
MEAN EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	6.5E-02	6.2E+00	0.0E+00	6.3E+00	7.3E-01	7.0E+00	NA	--	NA	--
Arsenic	7.3E+01	8.3E-02	8.0E-01	0.0E+00	8.9E-01	1.4E+00	2.3E+00	5.5E+00	<1	2.2E+01	<1
Barium	1.1E+02	9.2E-01	1.7E+00	0.0E+00	2.6E+00	2.2E+00	4.8E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	5.0E-01	2.7E-04	3.7E-03	0.0E+00	4.0E-03	9.7E-03	1.4E-02	NA	--	NA	--
Cadmium	5.4E+02	1.1E+00	1.7E+02	0.0E+00	1.7E+02	1.0E+01	1.8E+02	1.9E+00	**94.9**	2.1E+01	**8.5**
Chromium	1.4E+01	5.8E-03	7.1E-01	0.0E+00	7.2E-01	2.7E-01	9.9E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	9.5E+00	1.0E-02	1.9E-01	0.0E+00	2.0E-01	1.8E-01	3.8E-01	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+02	1.4E+00	5.0E+00	0.0E+00	6.4E+00	1.4E+01	2.1E+01	3.3E+01	<1	6.2E+01	<1
Lead	1.8E+04	3.5E+00	3.8E+02	0.0E+00	3.8E+02	3.6E+02	7.4E+02	7.4E+00	**100.0**	3.7E+01	**20.0**
Manganese	9.4E+02	1.3E+01	7.8E+00	0.0E+00	2.1E+01	1.8E+01	3.9E+01	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+01	1.1E-01	5.0E-01	0.0E+00	6.1E-01	4.5E-01	1.1E+00	4.5E-01	**2.4**	9.1E-01	**1.2**
Nickel	1.1E+01	3.6E-02	1.9E+00	0.0E+00	2.0E+00	2.1E-01	2.2E+00	8.0E+01	<1	1.1E+02	<1
Selenium	1.7E+01	6.1E-01	1.2E+00	0.0E+00	1.8E+00	3.2E-01	2.1E+00	4.0E-01	**5.3**	8.0E-01	**2.6**
Silver	6.1E+01	1.3E+00	2.1E+01	0.0E+00	2.2E+01	1.2E+00	2.3E+01	1.5E+01	**1.6**	4.4E+01	<1
Thallium	3.2E-01	6.9E-05	5.2E-02	0.0E+00	5.2E-02	6.1E-03	5.8E-02	NA	--	NA	--
Vanadium	1.3E+01	3.9E-03	8.9E-02	0.0E+00	9.3E-02	2.5E-01	3.4E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	6.4E+01	3.5E+02	0.0E+00	4.2E+02	3.5E+02	7.7E+02	1.5E+01	**53.0**	1.3E+02	**5.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-106
MAXIMUM EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	6.2E-01	1.5E+01	0.0E+00	1.5E+01	1.5E+00	1.7E+01	NA	--	NA	--
Arsenic	4.3E+02	3.7E-01	1.0E+00	0.0E+00	1.4E+00	2.7E+00	4.1E+00	5.5E+00	<1	2.2E+01	<1
Barium	2.5E+02	3.4E+00	1.4E+00	0.0E+00	4.7E+00	1.6E+00	6.3E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	1.8E-03	5.4E-03	0.0E+00	7.2E-03	1.2E-02	2.0E-02	NA	--	NA	--
Cadmium	3.7E+03	5.1E+00	2.2E+02	0.0E+00	2.2E+02	2.3E+01	2.5E+02	1.9E+00	**129.8**	2.1E+01	**11.7**
Chromium	4.2E+01	2.9E-02	7.8E-01	0.0E+00	8.0E-01	2.6E-01	1.1E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	9.1E-02	3.7E-01	0.0E+00	4.6E-01	3.2E-01	7.8E-01	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	4.7E+00	2.9E+00	0.0E+00	7.6E+00	2.8E+01	3.5E+01	3.3E+01	**1.1**	6.2E+01	<1
Lead	1.2E+05	1 7E+01	6.5E+02	0.0E+00	6.7E+02	7.7E+02	1.4E+03	7.4E+00	**194.5**	3.7E+01	**38.9**
Manganese	5.7E+03	1.3E+02	9.6E+00	0.0E+00	1.4E+02	3.5E+01	1.7E+02	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	4.9E-01	3.4E-01	0.0E+00	8.3E-01	9.2E-01	1.7E+00	4.5E-01	**3.9**	9.1E-01	**1.9**
Nickel	2.7E+01	1.1E-01	1.7E+00	0.0E+00	1.8E+00	1.7E-01	2.0E+00	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	6.1E+00	1.4E+00	0.0E+00	7.6E+00	5.4E-01	8.1E+00	4.0E-01	**20.3**	8.0E-01	**10.2**
Silver	4.1E+02	1.5E+01	5.0E+01	0.0E+00	6.4E+01	2.5E+00	6.7E+01	1.5E+01	**4.6**	4.4E+01	**1.5**
Thallium	1.1E+00	4.0E-04	6.6E-02	0.0E+00	6.6E-02	6.9E-03	7.3E-02	NA	--	NA	--
Vanadium	3.0E+01	1.5E-02	7.5E-02	0.0E+00	9.0E-02	1.9E-01	2.8E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	2.8E+02	2.3E+02	0.0E+00	5.1E+02	6.5E+02	1.2E+03	1.5E+01	**80.6**	1.3E+02	**8.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-107
MEAN EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	1.1E-01	2.3E+00	0.0E+00	2.4E+00	2.3E-01	2.6E+00	NA	--	NA	--
Arsenic	7.3E+01	1.4E-01	2.9E-01	0.0E+00	4.3E-01	4.6E-01	8.9E-01	5.5E+00	<1	2.2E+01	<1
Barium	1.1E+02	1.5E+00	6.1E-01	0.0E+00	2.1E+00	7.0E-01	2.8E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	5.0E-01	4.5E-04	1.4E-03	0.0E+00	1.8E-03	3.1E-03	4.9E-03	NA	--	NA	--
Cadmium	5.4E+02	1.8E+00	6.2E+01	0.0E+00	6.3E+01	3.3E+00	6.7E+01	1.9E+00	**35.1**	2.1E+01	**3.2**
Chromium	1.4E+01	9.6E-03	2.6E-01	0.0E+00	2.7E-01	8.8E-02	3.6E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	9.5E+00	1.7E-02	6.9E-02	0.0E+00	8.6E-02	5.9E-02	1.5E-01	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+02	2.3E+00	1.8E+00	0.0E+00	4.1E+00	4.6E+00	8.7E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.8E+04	5.8E+00	1.4E+02	0.0E+00	1.4E+02	1.2E+02	2.6E+02	7.4E+00	**35.1**	3.7E+01	**7.0**
Manganese	9.4E+02	2.1E+01	2.8E+00	0.0E+00	2.4E+01	5.9E+00	3.0E+01	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+01	1.8E-01	1.8E-01	0.0E+00	3.7E-01	1.5E-01	5.1E-01	4.5E-01	**1.1**	9.1E-01	<1
Nickel	1.1E+01	5.9E-02	7.0E-01	0.0E+00	7.6E-01	6.9E-02	8.3E-01	8.0E+01	<1	1.1E+02	<1
Selenium	1.7E+01	1.0E+00	4.3E-01	0.0E+00	1.4E+00	1.0E-01	1.5E+00	4.0E-01	**3.8**	8.0E-01	**1.9**
Silver	6.1E+01	2.2E+00	7.5E+00	0.0E+00	9.7E+00	3.8E-01	1.0E+01	1.5E+01	<1	4.4E+01	<1
Thallium	3.2E-01	1.1E-04	1.9E-02	0.0E+00	1.9E-02	2.0E-03	2.1E-02	NA	--	NA	--
Vanadium	1.3E+01	6.4E-03	3.2E-02	0.0E+00	3.9E-02	8.0E-02	1.2E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	1.1E+02	1.3E+02	0.0E+00	2.4E+02	1.1E+02	3.5E+02	1.5E+01	**24.0**	1.3E+02	**2.7**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-108
MAXIMUM EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	0.0E+00	0.0E+00	3.9E-03	3.9E-03	0.0E+00	3.9E-03	NA	--	NA	--
Arsenic	4 3E+02	0.0E+00	0.0E+00	9.0E-02	9.0E-02	0.0E+00	9.0E-02	5.5E+00	<1	2.2E+01	<1
Barium	2.5E+02	0.0E+00	0.0E+00	1.1E+00	1.1E+00	0.0E+00	1.1E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	2.0E+00	0.0E+00	0.0E+00	1.6E-06	1.6E-06	0.0E+00	1.6E-06	NA	--	NA	--
Cadmium	3.7E+03	0.0E+00	0.0E+00	1.8E+00	1.8E+00	0.0E+00	1.8E+00	1.9E+00	<1	2.1E+01	<1
Chromium	4.2E+01	0.0E+00	0.0E+00	2.9E-01	2.9E-01	0.0E+00	2.9E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	5.1E+01	0.0E+00	0.0E+00	8.3E-02	8.3E-02	0.0E+00	8.3E-02	7.6E+00	<1	3.8E+01	<1
Copper	4.5E+03	0.0E+00	0.0E+00	2.9E+00	2.9E+00	0.0E+00	2.9E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+05	0.0E+00	0.0E+00	1.9E+01	1.9E+01	0.0E+00	1.9E+01	7.4E+00	**2.5**	3.7E+01	<1
Manganese	5.7E+03	0.0E+00	0.0E+00	4.5E-02	4.5E-02	0.0E+00	4.5E-02	9.8E+02	<1	4.9E+03	<1
Mercury	1.5E+02	0.0E+00	0.0E+00	6.3E-01	6.3E-01	0.0E+00	6.3E-01	4.5E-01	**1.4**	9.1E-01	<1
Nickel	2.7E+01	0.0E+00	0.0E+00	2.9E-01	2.9E-01	0.0E+00	2.9E-01	8.0E+01	<1	1.1E+02	<1
Selenium	8.6E+01	0.0E+00	0.0E+00	2.8E-01	2.8E-01	0.0E+00	2.8E-01	4.0E-01	<1	8.0E-01	<1
Silver	4.1E+02	0.0E+00	0.0E+00	3.9E-02	3.9E-02	0.0E+00	3.9E-02	1.5E+01	<1	4.4E+01	<1
Thallium	1.1E+00	0.0E+00	0.0E+00	9.8E-03	9.8E-03	0.0E+00	9.8E-03	NA	--	NA	--
Vanadium	3.0E+01	0.0E+00	0.0E+00	3.3E-05	3.3E-05	0.0E+00	3.3E-05	1.1E+01	<1	5.7E+01	<1
Zinc	1.1E+05	0.0E+00	0.0E+00	1.6E+01	1.6E+01	0.0E+00	1.6E+01	1.5E+01	**1.1**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-109
MEAN EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	0.0E+00	0.0E+00	6.0E-04	6.0E-04	0.0E+00	6.0E-04	NA	--	NA	--
Arsenic	7.3E+01	0.0E+00	0.0E+00	2.1E-02	2.1E-02	0.0E+00	2.1E-02	5.5E+00	<1	2.2E+01	<1
Barium	1.1E+02	0.0E+00	0.0E+00	5.1E-01	5.1E-01	0.0E+00	5.1E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	5.0E-01	0.0E+00	0.0E+00	4.0E-07	4.0E-07	0.0E+00	4.0E-07	NA	--	NA	--
Cadmium	5.4E+02	0.0E+00	0.0E+00	6.0E-01	6.0E-01	0.0E+00	6.0E-01	1.9E+00	<1	2.1E+01	<1
Chromium	1.4E+01	0.0E+00	0.0E+00	1.3E-01	1.3E-01	0.0E+00	1.3E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	9.5E+00	0.0E+00	0.0E+00	1.5E-02	1.5E-02	0.0E+00	1.5E-02	7.6E+00	<1	3.8E+01	<1
Copper	7.4E+02	0.0E+00	0.0E+00	2.1E+00	2.1E+00	0.0E+00	2.1E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.8E+04	0.0E+00	0.0E+00	7.0E+00	7.0E+00	0.0E+00	7.0E+00	7.4E+00	<1	3.7E+01	<1
Manganese	9.4E+02	0.0E+00	0.0E+00	7.5E-03	7.5E-03	0.0E+00	7.5E-03	9.8E+02	<1	4.9E+03	<1
Mercury	2.3E+01	0.0E+00	0.0E+00	1.0E-01	1.0E-01	0.0E+00	1.0E-01	4.5E-01	<1	9.1E-01	<1
Nickel	1.1E+01	0.0E+00	0.0E+00	1.9E-01	1.9E-01	0.0E+00	1.9E-01	8.0E+01	<1	1.1E+02	<1
Selenium	1.7E+01	0.0E+00	0.0E+00	1.5E-01	1.5E-01	0.0E+00	1.5E-01	4.0E-01	<1	8.0E-01	<1
Silver	6.1E+01	0.0E+00	0.0E+00	5.8E-03	5.8E-03	0.0E+00	5.8E-03	1.5E+01	<1	4.4E+01	<1
Thallium	3.2E-01	0.0E+00	0.0E+00	2.8E-03	2.8E-03	0.0E+00	2.8E-03	NA	--	NA	--
Vanadium	1.3E+01	0.0E+00	0.0E+00	1.4E-05	1.4E-05	0.0E+00	1.4E-05	1.1E+01	<1	5.7E+01	<1
Zinc	1.8E+04	0.0E+00	0.0E+00	1.4E+01	1.4E+01	0.0E+00	1.4E+01	1.5E+01	<1	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-110
MAXIMUM EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	3.5E-01	0.0E+00	0.0E+00	3.5E-01	2.5E-01	6.0E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.3E+02	2.1E-01	0.0E+00	0.0E+00	2.1E-01	4.4E-01	6.5E-01	5.7E+00	<1	1.2E+01	<1
Barium	3.9E+02	3.0E+00	0.0E+00	0.0E+00	3.0E+00	4.0E-01	3.4E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	1.0E-03	0.0E+00	0.0E+00	1.0E-03	2.0E-03	3.0E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	2.9E+00	0.0E+00	0.0E+00	2.9E+00	3.7E+00	6.6E+00	5.1E+00	**1.3**	7.1E+00	<1
Chromium	4.2E+01	1.6E-02	0.0E+00	0.0E+00	1.6E-02	4.3E-02	5.9E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	5.2E-02	0.0E+00	0.0E+00	5.2E-02	5.2E-02	1.0E-01	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	2.6E+00	0.0E+00	0.0E+00	2.6E+00	4.5E+00	7.2E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	9.6E+00	0.0E+00	0.0E+00	9.6E+00	1.3E+02	1.4E+02	3.4E+01	**4.0**	8.0E+01	**1.7**
Manganese	5.7E+03	7.2E+01	0.0E+00	0.0E+00	7.2E+01	5.8E+00	7.8E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	2.8E-01	0.0E+00	0.0E+00	2.8E-01	1.5E-01	4.3E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	6.5E-02	0.0E+00	0.0E+00	6.5E-02	2.7E-02	9.2E-02	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	3.5E+00	0.0E+00	0.0E+00	3.5E+00	8.8E-02	3.6E+00	3.5E-01	**10.2**	1.1E+00	**3.4**
Silver	4.1E+02	8.2E+00	0.0E+00	0.0E+00	8.2E+00	4.1E-01	8.6E+00	4.4E+01	<1	2.2E+02	<1
Thallium	3.1E+00	6.3E-04	0.0E+00	0.0E+00	6.3E-04	3.1E-03	3.8E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	8.3E-03	0.0E+00	0.0E+00	8.3E-03	3.0E-02	3.9E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	1.6E+02	0.0E+00	0.0E+00	1.6E+02	1.1E+02	2.7E+02	1.6E+02	**1.7**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-111
MEAN EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.2E+01	6.6E-02	0.0E+00	0.0E+00	6.6E-02	4.2E-02	1.1E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	6.0E+01	6.9E-02	0.0E+00	0.0E+00	6.9E-02	6.1E-02	1.3E-01	5.7E+00	<1	1.2E+01	<1
Barium	1.2E+02	8.9E-01	0.0E+00	0.0E+00	8.9E-01	1.2E-01	1.0E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	4.0E-01	2.0E-04	0.0E+00	0.0E+00	2.0E-04	4.0E-04	6.1E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	4.5E+02	9.1E-01	0.0E+00	0.0E+00	9.1E-01	4.6E-01	1.4E+00	5.1E+00	<1	7.1E+00	<1
Chromium	1.5E+01	5.8E-03	0.0E+00	0.0E+00	5.8E-03	1.5E-02	2.1E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	7.7E+00	7.8E-03	0.0E+00	0.0E+00	7.8E-03	7.8E-03	1.6E-02	7.3E+00	<1	3.7E+01	<1
Copper	6.5E+02	1.2E+00	0.0E+00	0.0E+00	1.2E+00	6.6E-01	1.9E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.4E+04	2.8E+00	0.0E+00	0.0E+00	2.8E+00	1.4E+01	1.7E+01	3.4E+01	<1	8.0E+01	<1
Manganese	6.8E+02	8.7E+00	0.0E+00	0.0E+00	8.7E+00	7.0E-01	9.4E+00	8.8E+01	<1	2.8E+02	<1
Mercury	1.6E+01	8.5E-02	0.0E+00	0.0E+00	8.5E-02	1.7E-02	1.0E-01	1.3E+01	<1	5.6E+01	<1
Nickel	9.2E+00	2.9E-02	0.0E+00	0.0E+00	2.9E-02	9.3E-03	3.8E-02	6.0E+01	<1	8.0E+01	<1
Selenium	1.3E+01	4.5E-01	0.0E+00	0.0E+00	4.5E-01	1.4E-02	4.6E-01	3.5E-01	**1.3**	1.1E+00	<1
Silver	4.4E+01	9.0E-01	0.0E+00	0.0E+00	9.0E-01	4.5E-02	9.5E-01	4.4E+01	<1	2.2E+02	<1
Thallium	5.9E-01	1.2E-04	0.0E+00	0.0E+00	1.2E-04	6.0E-04	7.2E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	1.2E+01	3.4E-03	0.0E+00	0.0E+00	3.4E-03	1.2E-02	1.6E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.4E+04	5.2E+01	0.0E+00	0.0E+00	5.2E+01	1.4E+01	6.6E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available or total dose was not adjusted for bioavailability.

TABLE F-112
MAXIMUM EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	1.0E-01	0.0E+00	0.0E+00	1.0E-01	7.3E-02	1.7E-01	1.3E+01	<1	6 7E+01	<1
Arsenic	4.3E+02	6.0E-02	0.0E+00	0.0E+00	6.0E-02	1.3E-01	1.9E-01	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	5.5E-01	0.0E+00	0.0E+00	5.5E-01	7.3E-02	6.2E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	2.9E-04	0.0E+00	0.0E+00	2.9E-04	5.8E-04	8.8E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	8.3E-01	0.0E+00	0.0E+00	8.3E-01	1.1E+00	1.9E+00	5.1E+00	<1	7 1E+00	<1
Chromium	4.2E+01	4.7E-03	0.0E+00	0.0E+00	4.7E-03	1.2E-02	1.7E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	1 5E-02	0.0E+00	0.0E+00	1.5E-02	1.5E-02	3.0E-02	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	7.6E-01	0.0E+00	0.0E+00	7.6E-01	1.3E+00	2.1E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	2.8E+00	0.0E+00	0.0E+00	2.8E+00	3.6E+01	3.9E+01	3.4E+01	**1.2**	8.0E+01	<1
Manganese	5.7E+03	2.1E+01	0.0E+00	0.0E+00	2.1E+01	1.7E+00	2 3E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	8.0E-02	0.0E+00	0.0E+00	8.0E-02	4.3E-02	1.2E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	1.9E-02	0.0E+00	0.0E+00	1 9E-02	7.8E-03	2.7E-02	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	1.0E+00	0.0E+00	0.0E+00	1.0E+00	2.5E-02	1.0E+00	3.5E-01	**2.9**	1.1E+00	<1
Silver	4.1E+02	2.4E+00	0.0E+00	0.0E+00	2.4E+00	1.2E-01	2.5E+00	4.4E+01	<1	2.2E+02	<1
Thallium	1.1E+00	6.5E-05	0.0E+00	0.0E+00	6.5E-05	3.2E-04	3.9E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	2.4E-03	0.0E+00	0.0E+00	2.4E-03	8.7E-03	1.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	4 6E+01	0.0E+00	0.0E+00	4.6E+01	3 1E+01	7.7E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-113
MEAN EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	1.7E-02	0.0E+00	0.0E+00	1.7E-02	1.1E-02	2.8E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	7.3E+01	2.2E-02	0.0E+00	0.0E+00	2.2E-02	2.2E-02	4.4E-02	5.7E+00	<1	1.2E+01	<1
Barium	1.1E+02	2.5E-01	0.0E+00	0.0E+00	2.5E-01	3.3E-02	2.8E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	5.0E-01	7.4E-05	0.0E+00	0.0E+00	7.4E-05	1.5E-04	2.2E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	5.4E+02	2.9E-01	0.0E+00	0.0E+00	2.9E-01	1.6E-01	4.5E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.4E+01	1.6E-03	0.0E+00	0.0E+00	1.6E-03	4.2E-03	5.7E-03	7.4E+00	<1	3.7E+01	<1
Cobalt	9.5E+00	2.8E-03	0.0E+00	0.0E+00	2.8E-03	2.8E-03	5.6E-03	7.3E+00	<1	3.7E+01	<1
Copper	7.4E+02	3.8E-01	0.0E+00	0.0E+00	3.8E-01	2.2E-01	5.9E-01	1.2E+01	<1	1.5E+01	<1
Lead	1.8E+04	9.5E-01	0.0E+00	0.0E+00	9.5E-01	5.4E+00	6.4E+00	3.4E+01	<1	8.0E+01	<1
Manganese	9.4E+02	3.4E+00	0.0E+00	0.0E+00	3.4E+00	2.8E-01	3.7E+00	8.8E+01	<1	2.8E+02	<1
Mercury	2.3E+01	3.0E-02	0.0E+00	0.0E+00	3.0E-02	6.9E-03	3.6E-02	1.3E+01	<1	5.6E+01	<1
Nickel	1.1E+01	9.6E-03	0.0E+00	0.0E+00	9.6E-03	3.2E-03	1.3E-02	6.0E+01	<1	8.0E+01	<1
Selenium	1.7E+01	1.6E-01	0.0E+00	0.0E+00	1.6E-01	4.9E-03	1.7E-01	3.5E-01	<1	1.1E+00	<1
Silver	6.1E+01	3.6E-01	0.0E+00	0.0E+00	3.6E-01	1.8E-02	3.8E-01	4.4E+01	<1	2.2E+02	<1
Thallium	3.2E-01	1.9E-05	0.0E+00	0.0E+00	1.9E-05	9.3E-05	1.1E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	1.3E+01	1.0E-03	0.0E+00	0.0E+00	1.0E-03	3.8E-03	4.8E-03	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	1.7E+01	0.0E+00	0.0E+00	1.7E+01	5.3E+00	2.3E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-114
MAXIMUM EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	7.7E-01	2.8E+01	0.0E+00	2.9E+01	1.3E+00	3.0E+01	1.3E+01	**2.2**	6.7E+01	<1
Arsenic	4.3E+02	4.6E-01	1.9E+00	0.0E+00	2.4E+00	2.3E+00	4.7E+00	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	4 2E+00	2.5E+00	0.0E+00	6.8E+00	1.3E+00	8.1E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	2.2E-03	1.0E-02	0.0E+00	1.2E-02	1.1E-02	2.3E-02	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	6.3E+00	4.1E+02	0.0E+00	4.1E+02	2.0E+01	4.3E+02	5.1E+00	**85.2**	7.1E+00	**61.2**
Chromium	4.2E+01	3.6E-02	1.5E+00	0.0E+00	1.5E+00	2.3E-01	1.7E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	1.1E-01	6.9E-01	0.0E+00	8.1E-01	2.7E-01	1.1E+00	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	5.8E+00	5.5E+00	0.0E+00	1.1E+01	2.4E+01	3.5E+01	1.2E+01	**3.0**	1.5E+01	**2.3**
Lead	1.2E+05	2.1E+01	1.2E+03	0.0E+00	1.2E+03	6.7E+02	1.9E+03	3.4E+01	**55.9**	8.0E+01	**23.8**
Manganese	5.7E+03	1.6E+02	1.8E+01	0.0E+00	1.8E+02	3.1E+01	2.1E+02	8.8E+01	**2.4**	2.8E+02	<1
Mercury	1.5E+02	6.1E-01	6.3E-01	0.0E+00	1.2E+00	7.9E-01	2.0E+00	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	1.4E-01	3.2E+00	0.0E+00	3.3E+00	1.4E-01	3.5E+00	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	7.7E+00	2.7E+00	0.0E+00	1.0E+01	4.6E-01	1.1E+01	3.5E-01	**30.9**	1.1E+00	**10.3**
Silver	4.1E+02	1.8E+01	9.3E+01	0.0E+00	1.1E+02	2.2E+00	1.1E+02	4.4E+01	**2.5**	2.2E+02	<1
Thallium	1.1E+00	4.9E-04	1.2E-01	0.0E+00	1.2E-01	5.9E-03	1.3E-01	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	1.8E-02	1.4E-01	0.0E+00	1.6E-01	1.6E-01	3.2E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	3.5E+02	4.3E+02	0.0E+00	7.8E+02	5.6E+02	1.3E+03	1.6E+02	**8.4**	3.2E+02	**4.2**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-115
MEAN EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	1.3E-01	4.2E+00	0.0E+00	4.4E+00	2.0E-01	4.6E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	7.3E+01	1.7E-01	5.5E-01	0.0E+00	7.2E-01	-3.9E-01	1.1E+00	5.7E+00	<1	1.2E+01	<1
Barium	1.1E+02	1.9E+00	1.1E+00	0.0E+00	3.0E+00	6.0E-01	3.6E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	5.0E-01	5.6E-04	2.5E-03	0.0E+00	3.1E-03	2.7E-03	5.8E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	5.4E+02	2.2E+00	1.2E+02	0.0E+00	1.2E+02	2.9E+00	1.2E+02	5.1E+00	**23.6**	7.1E+00	**16.9**
Chromium	1.4E+01	1.2E-02	4.9E-01	0.0E+00	5.0E-01	7.6E-02	5.7E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	9.5E+00	2.1E-02	1.3E-01	0.0E+00	1.5E-01	5.1E-02	2.0E-01	7.3E+00	<1	3.7E+01	<1
Copper	7.4E+02	2.9E+00	3.4E+00	0.0E+00	6.3E+00	4.0E+00	1.0E+01	1.2E+01	<1	1.5E+01	<1
Lead	1.8E+04	7.3E+00	2.6E+02	0.0E+00	2.7E+02	9.9E+01	3.7E+02	3.4E+01	**10.8**	8.0E+01	**4.6**
Manganese	9.4E+02	2.6E+01	5.3E+00	0.0E+00	3.2E+01	5.0E+00	3.7E+01	8.8E+01	<1	2.8E+02	<1
Mercury	2.3E+01	2.3E-01	3.4E-01	0.0E+00	5.7E-01	1.3E-01	7.0E-01	1.3E+01	<1	5.6E+01	<1
Nickel	1.1E+01	7.4E-02	1.3E+00	0.0E+00	1.4E+00	5.9E-02	1.4E+00	6.0E+01	<1	8.0E+01	<1
Selenium	1.7E+01	1.2E+00	8.1E-01	0.0E+00	2.1E+00	8.9E-02	2.1E+00	3.5E-01	**6.1**	1.1E+00	**2.0**
Silver	6.1E+01	2.7E+00	1.4E+01	0.0E+00	1.7E+01	3.3E-01	1.7E+01	4.4E+01	<1	2.2E+02	<1
Thallium	3.2E-01	1.4E-04	3.5E-02	0.0E+00	3.6E-02	1.7E-03	3.7E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	1.3E+01	7.9E-03	6.1E-02	0.0E+00	6.9E-02	6.9E-02	1.4E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	1.3E+02	2.4E+02	0.0E+00	3.7E+02	9.7E+01	4.7E+02	1.6E+02	**2.9**	3.2E+02	**1.5**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-116
MAXIMUM EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	0.0E+00	3.3E+01	0.0E+00	3.3E+01	4.3E+00	3.8E+01	1.3E+01	**2.8**	6.7E+01	<1
Arsenic	4.3E+02	0.0E+00	2.3E+00	0.0E+00	2.3E+00	7.5E+00	9.8E+00	5.7E+00	**1.7**	1.2E+01	<1
Barium	3.9E+02	0.0E+00	4.8E+00	0.0E+00	4.8E+00	6.8E+00	1.2E+01	5.2E+01	<1	2.6E+02	<1
Beryllium	2 0E+00	0.0E+00	1.2E-02	0.0E+00	1.2E-02	3 5E-02	4.7E-02	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	0.0E+00	4.9E+02	0.0E+00	4.9E+02	6.4E+01	5.5E+02	5.1E+00	**108.3**	7.1E+00	**77.8**
Chromium	4 2E+01	0.0E+00	1.7E+00	0.0E+00	1.7E+00	7.4E-01	2.5E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5 1E+01	0.0E+00	8.3E-01	0 0E+00	8.3E-01	8.9E-01	1.7E+00	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	0.0E+00	6.6E+00	0.0E+00	6.6E+00	7.8E+01	8.4E+01	1.2E+01	**7.2**	1 5E+01	**5.6**
Lead	1 2E+05	0.0E+00	1.5E+03	0 0E+00	1.5E+03	2.2E+03	3.6E+03	3.4E+01	**106.2**	8.0E+01	**45.1**
Manganese	5.7E+03	0.0E+00	2.2E+01	0.0E+00	2.2E+01	9.9E+01	1.2E+02	8.8E+01	**1.4**	2.8E+02	<1
Mercury	1.5E+02	0.0E+00	7.5E-01	0.0E+00	7.5E-01	2.6E+00	3.3E+00	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	0.0E+00	3.8E+00	0.0E+00	3.8E+00	4.7E-01	4.3E+00	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	0.0E+00	3.2E+00	0 0E+00	3.2E+00	1.5E+00	4.7E+00	3.5E-01	**13.5**	1.1E+00	**4.5**
Silver	4.1E+02	0.0E+00	1.1E+02	0.0E+00	1.1E+02	7.1E+00	1.2E+02	4.4E+01	**2.7**	2.2E+02	<1
Thallium	3.1E+00	0.0E+00	4.1E-01	0.0E+00	4.1E-01	5.4E-02	4.7E-01	2.0E-01	**2.3**	1.0E+00	<1
Vanadium	3.0E+01	0.0E+00	1.7E-01	0.0E+00	1.7E-01	5.2E-01	6.9E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	0.0E+00	5.2E+02	0.0E+00	5.2E+02	1.8E+03	2.3E+03	1 6E+02	**14.7**	3 2E+02	**7.3**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= *Dietary fraction of food item i (proportion of food type in the diet)*
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-117
MEAN EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.2E+01	0.0E+00	5.6E+00	0.0E+00	5.6E+00	7.3E-01	6.3E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	6.0E+01	0.0E+00	5.7E-01	0.0E+00	5.7E-01	1.0E+00	1.6E+00	5.7E+00	<1	1.2E+01	<1
Barium	1.2E+02	0.0E+00	1.4E+00	0.0E+00	1.4E+00	2.0E+00	3.5E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	4.0E-01	0.0E+00	2.4E-03	0.0E+00	2.4E-03	6.9E-03	9.3E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	4.5E+02	0.0E+00	1.2E+02	0.0E+00	1.2E+02	7.8E+00	1.3E+02	5.1E+00	**25.6**	7.1E+00	**18.4**
Chromium	1.5E+01	0.0E+00	6.2E-01	0.0E+00	6.2E-01	2.6E-01	8.9E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	7.7E+00	0.0E+00	1.3E-01	0.0E+00	1.3E-01	1.3E-01	2.6E-01	7.3E+00	<1	3.7E+01	<1
Copper	6.5E+02	0.0E+00	3.9E+00	0.0E+00	3.9E+00	1.1E+01	1.5E+01	1.2E+01	**1.3**	1.5E+01	**1.0**
Lead	1.4E+04	0.0E+00	2.4E+02	0.0E+00	2.4E+02	2.4E+02	4.8E+02	3.4E+01	**14.3**	8.0E+01	**6.1**
Manganese	6.8E+02	0.0E+00	5.1E+00	0.0E+00	5.1E+00	1.2E+01	1.7E+01	8.8E+01	<1	2.8E+02	<1
Mercury	1.6E+01	0.0E+00	3.6E-01	0.0E+00	3.6E-01	2.9E-01	6.5E-01	1.3E+01	<1	5.6E+01	<1
Nickel	9.2E+00	0.0E+00	1.3E+00	0.0E+00	1.3E+00	1.6E-01	1.5E+00	6.0E+01	<1	8.0E+01	<1
Selenium	1.3E+01	0.0E+00	8.3E-01	0.0E+00	8.3E-01	2.3E-01	1.1E+00	3.5E-01	**3.0**	1.1E+00	**1.0**
Silver	4.4E+01	0.0E+00	1.2E+01	0.0E+00	1.2E+01	7.7E-01	1.3E+01	4.4E+01	<1	2.2E+02	<1
Thallium	5.9E-01	0.0E+00	7.9E-02	0.0E+00	7.9E-02	1.0E-02	8.9E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	1.2E+01	0.0E+00	6.9E-02	0.0E+00	6.9E-02	2.1E-01	2.8E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.4E+04	0.0E+00	2.7E+02	0.0E+00	2.7E+02	2.5E+02	5.1E+02	1.6E+02	**3.2**	3.2E+02	**1.6**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-118
MAXIMUM EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.5E+02	2.2E-02	0.0E+00	1.5E-03	2.4E-02	2.3E-01	2.5E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	4.3E+02	1.3E-02	0.0E+00	3.3E-02	4.6E-02	3.9E-01	4.4E-01	5.7E+00	<1	1.2E+01	<1
Barium	2.5E+02	1.2E-01	0.0E+00	4.1E-01	5.4E-01	2.3E-01	7.6E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	2.0E+00	6.5E-05	0.0E+00	5.8E-07	6.5E-05	1.8E-03	1.9E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.7E+03	1.8E-01	0.0E+00	6.5E-01	8.4E-01	3.3E+00	4.2E+00	5.1E+00	<1	7.1E+00	<1
Chromium	4.2E+01	1.0E-03	0.0E+00	1.1E-01	1.1E-01	3.8E-02	1.5E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	5.1E+01	3.3E-03	0.0E+00	3.0E-02	3.4E-02	4.6E-02	8.0E-02	7.3E+00	<1	3.7E+01	<1
Copper	4.5E+03	1.7E-01	0.0E+00	1.1E+00	1.2E+00	4.1E+00	5.3E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+05	6.1E-01	0.0E+00	6.9E+00	7.5E+00	1.1E+02	1.2E+02	3.4E+01	**3.5**	8.0E+01	**1.5**
Manganese	5.7E+03	4.6E+00	0.0E+00	1.7E-02	4.6E+00	5.2E+00	9.8E+00	8.8E+01	<1	2.8E+02	<1
Mercury	1.5E+02	1.8E-02	0.0E+00	2.3E-01	2.5E-01	1.3E-01	3.8E-01	1.3E+01	<1	5.6E+01	<1
Nickel	2.7E+01	4.1E-03	0.0E+00	1.1E-01	1.1E-01	2.4E-02	1.3E-01	6.0E+01	<1	8.0E+01	<1
Selenium	8.6E+01	2.2E-01	0.0E+00	1.0E-01	3.3E-01	7.9E-02	4.0E-01	3.5E-01	**1.2**	1.1E+00	<1
Silver	4.1E+02	5.3E-01	0.0E+00	1.4E-02	5.4E-01	3.7E-01	9.1E-01	4.4E+01	<1	2.2E+02	<1
Thallium	1.1E+00	1.4E-05	0.0E+00	3.6E-03	3.6E-03	1.0E-03	4.6E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	3.0E+01	5.3E-04	0.0E+00	1.2E-05	5.4E-04	2.7E-02	2.8E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.1E+05	1.0E+01	0.0E+00	6.0E+00	1.6E+01	9.6E+01	1.1E+02	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-119
MEAN EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE 25-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	3.8E+01	3.8E-03	0.0E+00	2.2E-04	4.1E-03	3.4E-02	3.8E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	7.3E+01	4.9E-03	0.0E+00	7.7E-03	1.3E-02	6.7E-02	7.9E-02	5.7E+00	<1	1.2E+01	<1
Barium	1.1E+02	5.5E-02	0.0E+00	1.9E-01	2.4E-01	1.0E-01	3.4E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	5.0E-01	1.6E-05	0.0E+00	1.5E-07	1.6E-05	4.6E-04	4.7E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	5.4E+02	6.4E-02	0.0E+00	2.2E-01	2.8E-01	4.9E-01	7.7E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.4E+01	3.5E-04	0.0E+00	4.8E-02	4.8E-02	1.3E-02	6.1E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	9.5E+00	6.2E-04	0.0E+00	5.7E-03	6.3E-03	8.6E-03	1.5E-02	7.3E+00	<1	3.7E+01	<1
Copper	7.4E+02	8.3E-02	0.0E+00	7.8E-01	8.6E-01	6.7E-01	1.5E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.8E+04	2.1E-01	0.0E+00	2.6E+00	2.8E+00	1.7E+01	2.0E+01	3.4E+01	<1	8.0E+01	<1
Manganese	9.4E+02	7.6E-01	0.0E+00	2.7E-03	7.6E-01	8.5E-01	1.6E+00	8.8E+01	<1	2.8E+02	<1
Mercury	2.3E+01	6.6E-03	0.0E+00	3.7E-02	4.4E-02	2.1E-02	6.5E-02	1.3E+01	<1	5.6E+01	<1
Nickel	1.1E+01	2.1E-03	0.0E+00	7.0E-02	7.2E-02	1.0E-02	8.2E-02	6.0E+01	<1	8.0E+01	<1
Selenium	1.7E+01	3.6E-02	0.0E+00	5.6E-02	9.2E-02	1.5E-02	1.1E-01	3.5E-01	<1	1.1E+00	<1
Silver	6.1E+01	7.9E-02	0.0E+00	2.1E-03	8.1E-02	5.6E-02	1.4E-01	4.4E+01	<1	2.2E+02	<1
Thallium	3.2E-01	4.1E-06	0.0E+00	1.0E-03	1.0E-03	2.9E-04	1.3E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	1.3E+01	2.3E-04	0.0E+00	5.2E-06	2.4E-04	1.2E-02	1.2E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.8E+04	3.8E+00	0.0E+00	5.3E+00	9.1E+00	1.6E+01	2.6E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-120
MAXIMUM EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	2.4E-01	0.0E+00	0.0E+00	2.4E-01	7.1E-01	9.5E-01	NA	--	NA	--
Arsenic	1.6E+02	7.5E-02	0.0E+00	0.0E+00	7.5E-02	4.2E-01	5.0E-01	5.5E+00	<1	2.2E+01	<1
Barium	1.7E+02	7.9E-01	0.0E+00	0.0E+00	7.9E-01	4.3E-01	1.2E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.7E-01	1.2E-04	0.0E+00	0.0E+00	1.2E-04	9.6E-04	1.1E-03	NA	--	NA	--
Cadmium	3.2E+02	4.7E-01	0.0E+00	0.0E+00	4.7E-01	8.4E-01	1.3E+00	1.9E+00	<1	2.1E+01	<1
Chromium	2.9E+01	7.0E-03	0.0E+00	0.0E+00	7.0E-03	7.6E-02	8.3E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	4.0E+00	2.5E-03	0.0E+00	0.0E+00	2.5E-03	1.0E-02	1.3E-02	7.6E+00	<1	3.8E+01	<1
Copper	4.7E+02	6.8E-01	0.0E+00	0.0E+00	6.8E-01	1.2E+00	1.9E+00	3.3E+01	<1	6.2E+01	<1
Lead	5.7E+03	1.1E+00	0.0E+00	0.0E+00	1.1E+00	1.5E+01	1.6E+01	7.4E+00	**2.2**	3.7E+01	<1
Manganese	4.3E+02	3.4E+00	0.0E+00	0.0E+00	3.4E+00	1.1E+00	4.5E+00	9.8E+02	<1	4.9E+03	<1
Mercury	2.1E+01	6.0E-02	0.0E+00	0.0E+00	6.0E-02	5.4E-02	1.1E-01	4.5E-01	<1	9.1E-01	<1
Nickel	9.5E+00	1.9E-02	0.0E+00	0.0E+00	1.9E-02	2.5E-02	4.3E-02	8.0E+01	<1	1.1E+02	<1
Selenium	9.6E+00	1.9E-01	0.0E+00	0.0E+00	1.9E-01	2.5E-02	2.2E-01	4.0E-01	<1	8.0E-01	<1
Silver	2.1E+01	2.7E-01	0.0E+00	0.0E+00	2.7E-01	5.5E-02	3.3E-01	1.5E+01	<1	4.4E+01	<1
Thallium	3.4E-01	4.4E-05	0.0E+00	0.0E+00	4.4E-05	8.9E-04	9.4E-04	NA	--	NA	--
Vanadium	8.6E+00	1.5E-03	0.0E+00	0.0E+00	1.5E-03	2.2E-02	2.4E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	2.7E+01	0.0E+00	0.0E+00	2.7E+01	2.6E+01	5.3E+01	1.5E+01	**3.6**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-121
MEAN EXPOSURE ESTIMATE - CANADA GOOSE
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Canada Goose Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	4.7E-02	0.0E+00	0.0E+00	4.7E-02	1.3E-01	1.7E-01	NA	--	NA	--
Arsenic	3.4E+01	3.1E-02	0.0E+00	0.0E+00	3.1E-02	8.9E-02	1.2E-01	5.5E+00	<1	2.2E+01	<1
Barium	4.1E+01	2.0E-01	0.0E+00	0.0E+00	2.0E-01	1.1E-01	3.0E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	1.1E-01	3.4E-05	0.0E+00	0.0E+00	3.4E-05	2.8E-04	3.1E-04	NA	--	NA	--
Cadmium	5.9E+01	1.8E-01	0.0E+00	0.0E+00	1.8E-01	1.5E-01	3.4E-01	1.9E+00	<1	2.1E+01	<1
Chromium	9.9E+00	2.4E-03	0.0E+00	0.0E+00	2.4E-03	2.6E-02	2.8E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	1.7E+00	1.1E-03	0.0E+00	0.0E+00	1.1E-03	4.3E-03	5.4E-03	7.6E+00	<1	3.8E+01	<1
Copper	9.3E+01	3.6E-01	0.0E+00	0.0E+00	3.6E-01	2.4E-01	6.1E-01	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+03	4.4E-01	0.0E+00	0.0E+00	4.4E-01	3.0E+00	3.4E+00	7.4E+00	<1	3.7E+01	<1
Manganese	9.5E+01	7.5E-01	0.0E+00	0.0E+00	7.5E-01	2.5E-01	1.0E+00	9.8E+02	<1	4.9E+03	<1
Mercury	3.9E+00	2.5E-02	0.0E+00	0.0E+00	2.5E-02	1.0E-02	3.5E-02	4.5E-01	<1	9.1E-01	<1
Nickel	3.9E+00	9.5E-03	0.0E+00	0.0E+00	9.5E-03	1.0E-02	2.0E-02	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+00	4.2E-02	0.0E+00	0.0E+00	4.2E-02	6.2E-03	4.8E-02	4.0E-01	<1	8.0E-01	<1
Silver	4.2E+00	5.4E-02	0.0E+00	0.0E+00	5.4E-02	1.1E-02	6.5E-02	1.5E+01	<1	4.4E+01	<1
Thallium	1.4E-01	1.8E-05	0.0E+00	0.0E+00	1.8E-05	3.6E-04	3.8E-04	NA	--	NA	--
Vanadium	5.0E+00	8.7E-04	0.0E+00	0.0E+00	8.7E-04	1.3E-02	1.4E-02	1.1E+01	<1	5.7E+01	<1
Zinc	2.9E+03	1.3E+01	0.0E+00	0.0E+00	1.3E+01	7.4E+00	2.1E+01	1.5E+01	1.4	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-122
MAXIMUM EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	4.1E-01	4.5E+01	0.0E+00	4.5E+01	5.3E+00	5.1E+01	NA	--	NA	--
Arsenic	1.6E+02	1.3E-01	1.4E+00	0.0E+00	1.5E+00	3.1E+00	4.7E+00	5.5E+00	<1	2.2E+01	<1
Barium	1.7E+02	1.4E+00	2.5E+00	0.0E+00	3.8E+00	3.2E+00	7.0E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.7E-01	2.0E-04	2.7E-03	0.0E+00	2.9E-03	7.1E-03	1.0E-02	NA	--	NA	--
Cadmium	3.2E+02	8.1E-01	1.2E+02	0.0E+00	1.2E+02	6.2E+00	1.3E+02	1.9E+00	**67.1**	2.1E+01	**6.0**
Chromium	2.9E+01	1.2E-02	1.5E+00	0.0E+00	1.5E+00	5.6E-01	2.0E+00	3.8E+01	<1	7.5E+01	<1
Cobalt	4.0E+00	4.4E-03	8.0E-02	0.0E+00	8.4E-02	7.7E-02	1.6E-01	7.6E+00	<1	3.8E+01	<1
Copper	4.7E+02	1.2E+00	4.5E+00	0.0E+00	5.6E+00	9.0E+00	1.5E+01	3.3E+01	<1	6.2E+01	<1
Lead	5.7E+03	1.8E+00	1.5E+02	0.0E+00	1.5E+02	1.1E+02	2.6E+02	7.4E+00	**35.1**	3.7E+01	**7.0**
Manganese	4.3E+02	5.9E+00	4.5E+00	0.0E+00	1.0E+01	8.3E+00	1.9E+01	9.8E+02	<1	4.9E+03	<1
Mercury	2.1E+01	1.0E-01	4.8E-01	0.0E+00	5.9E-01	4.0E-01	9.9E-01	4.5E-01	**2.2**	9.1E-01	**1.1**
Nickel	9.5E+00	3.2E-02	1.7E+00	0.0E+00	1.7E+00	1.8E-01	1.9E+00	8.0E+01	<1	1.1E+02	<1
Selenium	9.6E+00	3.3E-01	7.9E-01	0.0E+00	1.1E+00	1.8E-01	1.3E+00	4.0E-01	**3.3**	8.0E-01	**1.6**
Silver	2.1E+01	4.7E-01	7.2E+00	0.0E+00	7.6E+00	4.1E-01	8.0E+00	1.5E+01	<1	4.4E+01	<1
Thallium	3.4E-01	7.5E-05	5.6E-02	0.0E+00	5.6E-02	6.6E-03	6.3E-02	NA	--	NA	--
Vanadium	8.6E+00	2.6E-03	6.0E-02	0.0E+00	6.2E-02	1.7E-01	2.3E-01	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	4.6E+01	2.9E+02	0.0E+00	3.4E+02	1.9E+02	5.3E+02	1.5E+01	**36.6**	1.3E+02	**4.0**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-123
MEAN EXPOSURE ESTIMATE - SONG SPARROW
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Song Sparrow Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	8.2E-02	7.9E+00	0.0E+00	8.0E+00	9.3E-01	9.0E+00	NA	--	NA	--
Arsenic	3.4E+01	5.4E-02	4.7E-01	0.0E+00	5.2E-01	6.6E-01	1.2E+00	5.5E+00	<1	2.2E+01	<1
Barium	4.1E+01	3.4E-01	6.1E-01	0.0E+00	9.5E-01	7.9E-01	1.7E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	1.1E-01	5.9E-05	8.0E-04	0.0E+00	8.6E-04	2.1E-03	2.9E-03	NA	--	NA	--
Cadmium	5.9E+01	3.2E-01	3.9E+01	0.0E+00	4.0E+01	1.1E+00	4.1E+01	1.9E+00	**21.4**	2.1E+01	**1.9**
Chromium	9.9E+00	4.1E-03	5.0E-01	0.0E+00	5.0E-01	1.9E-01	6.9E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	1.7E+00	1.8E-03	3.3E-02	0.0E+00	3.5E-02	3.2E-02	6.7E-02	7.6E+00	<1	3.8E+01	<1
Copper	9.3E+01	6.3E-01	2.9E+00	0.0E+00	3.5E+00	1.8E+00	5.3E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+03	7.5E-01	4.0E+01	0.0E+00	4.1E+01	2.2E+01	6.3E+01	7.4E+00	**8.5**	3.7E+01	**1.7**
Manganese	9.5E+01	1.3E+00	1.6E+00	0.0E+00	2.9E+00	1.8E+00	4.7E+00	9.8E+02	<1	4.9E+03	<1
Mercury	3.9E+00	4.2E-02	2.8E-01	0.0E+00	3.2E-01	7.6E-02	4.0E-01	4.5E-01	<1	9.1E-01	<1
Nickel	3.9E+00	1.6E-02	6.8E-01	0.0E+00	6.9E-01	7.5E-02	7.7E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+00	7.2E-02	2.9E-01	0.0E+00	3.6E-01	4.6E-02	4.1E-01	4.0E-01	**1.0**	8.0E-01	<1
Silver	4.2E+00	9.3E-02	1.4E+00	0.0E+00	1.5E+00	8.2E-02	1.6E+00	1.5E+01	<1	4.4E+01	<1
Thallium	1.4E-01	3.1E-05	2.3E-02	0.0E+00	2.3E-02	2.7E-03	2.6E-02	NA	--	NA	--
Vanadium	5.0E+00	1.5E-03	3.4E-02	0.0E+00	3.6E-02	9.6E-02	1.3E-01	1.1E+01	<1	5.7E+01	<1
Zinc	2.9E+03	2.3E+01	1.9E+02	0.0E+00	2.2E+02	5.5E+01	2.7E+02	1.5E+01	**18.7**	1.3E+02	**2.1**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-124
MAXIMUM EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	6.8E-01	1.6E+01	0.0E+00	1.7E+01	1.7E+00	1.9E+01	NA	--	NA	--
Arsenic	1.6E+02	2.1E-01	5.1E-01	0.0E+00	7.3E-01	1.0E+00	1.7E+00	5.5E+00	<1	2.2E+01	<1
Barium	1.7E+02	2.2E+00	9.1E-01	0.0E+00	3.1E+00	1.0E+00	4.2E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	3.7E-01	3.3E-04	1.0E-03	0.0E+00	1.3E-03	2.3E-03	3.6E-03	NA	--	NA	--
Cadmium	3.2E+02	1.3E+00	4.4E+01	0.0E+00	4.5E+01	2.0E+00	4.7E+01	1.9E+00	**24.9**	2.1E+01	**2.2**
Chromium	2.9E+01	2.0E-02	5.4E-01	0.0E+00	5.6E-01	1.8E-01	7.4E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	4.0E+00	7.2E-03	2.9E-02	0.0E+00	3.6E-02	2.5E-02	6.1E-02	7.6E+00	<1	3.8E+01	<1
Copper	4.7E+02	1.9E+00	1.6E+00	0.0E+00	3.6E+00	2.9E+00	6.5E+00	3.3E+01	<1	6.2E+01	<1
Lead	5.7E+03	3.0E+00	5.4E+01	0.0E+00	5.7E+01	3.6E+01	9.2E+01	7.4E+00	**12.5**	3.7E+01	**2.5**
Manganese	4.3E+02	9.6E+00	1.7E+00	0.0E+00	1.1E+01	2.7E+00	1.4E+01	9.8E+02	<1	4.9E+03	<1
Mercury	2.1E+01	1.7E-01	1.8E-01	0.0E+00	3.5E-01	1.3E-01	4.8E-01	4.5E-01	**1.1**	9.1E-01	<1
Nickel	9.5E+00	5.3E-02	6.0E-01	0.0E+00	6.5E-01	5.9E-02	7.1E-01	8.0E+01	<1	1.1E+02	<1
Selenium	9.6E+00	5.5E-01	2.9E-01	0.0E+00	8.3E-01	6.0E-02	8.9E-01	4.0E-01	**2.2**	8.0E-01	**1.1**
Silver	2.1E+01	7.7E-01	2.6E+00	0.0E+00	3.4E+00	1.3E-01	3.5E+00	1.5E+01	<1	4.4E+01	<1
Thallium	3.4E-01	1.2E-04	2.1E-02	0.0E+00	2.1E-02	2.1E-03	2.3E-02	NA	--	NA	--
Vanadium	8.6E+00	4.3E-03	2.2E-02	0.0E+00	2.6E-02	5.4E-02	8.0E-02	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	7.6E+01	1.1E+02	0.0E+00	1.8E+02	6.2E+01	2.4E+02	1.5E+01	**16.9**	1.3E+02	**1.9**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-125
MEAN EXPOSURE ESTIMATE - AMERICAN ROBIN
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	American Robin Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	1.3E-01	2.9E+00	0.0E+00	3.0E+00	3.0E-01	3.3E+00	NA	--	NA	--
Arsenic	3.4E+01	8.9E-02	1.7E-01	0.0E+00	2.6E-01	2.1E-01	4.7E-01	5.5E+00	<1	2.2E+01	<1
Barium	4.1E+01	5.5E-01	2.2E-01	0.0E+00	7.8E-01	2.6E-01	1.0E+00	2.1E+02	<1	4.2E+02	<1
Beryllium	1.1E-01	9.7E-05	2.9E-04	0.0E+00	3.9E-04	6.7E-04	1.1E-03	NA	--	NA	--
Cadmium	5.9E+01	5.2E-01	1.4E+01	0.0E+00	1.5E+01	3.7E-01	1.5E+01	1.9E+00	**8.0**	2.1E+01	<1
Chromium	9.9E+00	6.7E-03	1.8E-01	0.0E+00	1.9E-01	6.2E-02	2.5E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	1.7E+00	3.0E-03	1.2E-02	0.0E+00	1.5E-02	1.0E-02	2.5E-02	7.6E+00	<1	3.8E+01	<1
Copper	9.3E+01	1.0E+00	1.1E+00	0.0E+00	2.1E+00	5.8E-01	2.7E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+03	1.2E+00	1.5E+01	0.0E+00	1.6E+01	7.2E+00	2.3E+01	7.4E+00	**3.1**	3.7E+01	<1
Manganese	9.5E+01	2.1E+00	5.9E-01	0.0E+00	2.7E+00	5.9E-01	3.3E+00	9.8E+02	<1	4.9E+03	<1
Mercury	3.9E+00	6.9E-02	1.0E-01	0.0E+00	1.7E-01	2.5E-02	2.0E-01	4.5E-01	<1	9.1E-01	<1
Nickel	3.9E+00	2.7E-02	2.5E-01	0.0E+00	2.7E-01	2.4E-02	3.0E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+00	1.2E-01	1.0E-01	0.0E+00	2.2E-01	1.5E-02	2.4E-01	4.0E-01	<1	8.0E-01	<1
Silver	4.2E+00	1.5E-01	5.2E-01	0.0E+00	6.7E-01	2.6E-02	7.0E-01	1.5E+01	<1	4.4E+01	<1
Thallium	1.4E-01	5.0E-05	8.4E-03	0.0E+00	8.4E-03	8.7E-04	9.3E-03	NA	--	NA	--
Vanadium	5.0E+00	2.5E-03	1.3E-02	0.0E+00	1.5E-02	3.1E-02	4.6E-02	1.1E+01	<1	5.7E+01	<1
Zinc	2.9E+03	3.8E+01	7.0E+01	0.0E+00	1.1E+02	1.8E+01	1.3E+02	1.5E+01	**8.7**	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-126
MAXIMUM EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	0.0E+00	0.0E+00	4.3E-03	4.3E-03	0.0E+00	4.3E-03	NA	--	NA	--
Arsenic	1.6E+02	0.0E+00	0.0E+00	4.0E-02	4.0E-02	0.0E+00	4.0E-02	5.5E+00	<1	2.2E+01	<1
Barium	1.7E+02	0.0E+00	0.0E+00	7.5E-01	7.5E-01	0.0E+00	7.5E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	3.7E-01	0.0E+00	0.0E+00	2.9E-07	2.9E-07	0.0E+00	2.9E-07	NA	--	NA	--
Cadmium	3.2E+02	0.0E+00	0.0E+00	4.5E-01	4.5E-01	0.0E+00	4.5E-01	1.9E+00	<1	2.1E+01	<1
Chromium	2.9E+01	0.0E+00	0.0E+00	2.2E-01	2.2E-01	0.0E+00	2.2E-01	3.8E+01	<1	7.5E+01	<1
Cobalt	4.0E+00	0.0E+00	0.0E+00	6.5E-03	6.5E-03	0.0E+00	6.5E-03	7.6E+00	<1	3.8E+01	<1
Copper	4.7E+02	0.0E+00	0.0E+00	2.0E+00	2.0E+00	0.0E+00	2.0E+00	3.3E+01	<1	6.2E+01	<1
Lead	5.7E+03	0.0E+00	0.0E+00	3.8E+00	3.8E+00	0.0E+00	3.8E+00	7.4E+00	<1	3.7E+01	<1
Manganese	4.3E+02	0.0E+00	0.0E+00	3.4E-03	3.4E-03	0.0E+00	3.4E-03	9.8E+02	<1	4.9E+03	<1
Mercury	2.1E+01	0.0E+00	0.0E+00	9.0E-02	9.0E-02	0.0E+00	9.0E-02	4.5E-01	<1	9.1E-01	<1
Nickel	9.5E+00	0.0E+00	0.0E+00	1.8E-01	1.8E-01	0.0E+00	1.8E-01	8.0E+01	<1	1.1E+02	<1
Selenium	9.6E+00	0.0E+00	0.0E+00	1.2E-01	1.2E-01	0.0E+00	1.2E-01	4.0E-01	<1	8.0E-01	<1
Silver	2.1E+01	0.0E+00	0.0E+00	2.0E-03	2.0E-03	0.0E+00	2.0E-03	1.5E+01	<1	4.4E+01	<1
Thallium	3.4E-01	0.0E+00	0.0E+00	3.1E-03	3.1E-03	0.0E+00	3.1E-03	NA	--	NA	--
Vanadium	8.6E+00	0.0E+00	0.0E+00	9.4E-06	9.4E-06	0.0E+00	9.4E-06	1.1E+01	<1	5.7E+01	<1
Zinc	1.0E+04	0.0E+00	0.0E+00	1.4E+01	1.4E+01	0.0E+00	1.4E+01	1.5E+01	<1	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-127
MEAN EXPOSURE ESTIMATE - RED-TAILED HAWK
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red-tailed Hawk Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	0.0E+00	0.0E+00	7.7E-04	7.7E-04	0.0E+00	7.7E-04	NA	--	NA	--
Arsenic	3.4E+01	0.0E+00	0.0E+00	1.1E-02	1.1E-02	0.0E+00	1.1E-02	5.5E+00	<1	2.2E+01	<1
Barium	4.1E+01	0.0E+00	0.0E+00	1.8E-01	1.8E-01	0.0E+00	1.8E-01	2.1E+02	<1	4.2E+02	<1
Beryllium	1.1E-01	0.0E+00	0.0E+00	8.6E-08	8.6E-08	0.0E+00	8.6E-08	NA	--	NA	--
Cadmium	5.9E+01	0.0E+00	0.0E+00	1.7E-01	1.7E-01	0.0E+00	1.7E-01	1.9E+00	<1	2.1E+01	<1
Chromium	9.9E+00	0.0E+00	0.0E+00	9.9E-02	9.9E-02	0.0E+00	9.9E-02	3.8E+01	<1	7.5E+01	<1
Cobalt	1.7E+00	0.0E+00	0.0E+00	2.7E-03	2.7E-03	0.0E+00	2.7E-03	7.6E+00	<1	3.8E+01	<1
Copper	9.3E+01	0.0E+00	0.0E+00	1.5E+00	1.5E+00	0.0E+00	1.5E+00	3.3E+01	<1	6.2E+01	<1
Lead	1.2E+03	0.0E+00	0.0E+00	1.7E+00	1.7E+00	0.0E+00	1.7E+00	7.4E+00	<1	3.7E+01	<1
Manganese	9.5E+01	0.0E+00	0.0E+00	7.5E-04	7.5E-04	0.0E+00	7.5E-04	9.8E+02	<1	4.9E+03	<1
Mercury	3.9E+00	0.0E+00	0.0E+00	1.7E-02	1.7E-02	0.0E+00	1.7E-02	4.5E-01	<1	9.1E-01	<1
Nickel	3.9E+00	0.0E+00	0.0E+00	1.2E-01	1.2E-01	0.0E+00	1.2E-01	8.0E+01	<1	1.1E+02	<1
Selenium	2.4E+00	0.0E+00	0.0E+00	7.3E-02	7.3E-02	0.0E+00	7.3E-02	4.0E-01	<1	8.0E-01	<1
Silver	4.2E+00	0.0E+00	0.0E+00	4.0E-04	4.0E-04	0.0E+00	4.0E-04	1.5E+01	<1	4.4E+01	<1
Thallium	1.4E-01	0.0E+00	0.0E+00	1.2E-03	1.2E-03	0.0E+00	1.2E-03	NA	--	NA	--
Vanadium	5.0E+00	0.0E+00	0.0E+00	5.4E-06	5.4E-06	0.0E+00	5.4E-06	1.1E+01	<1	5.7E+01	<1
Zinc	2.9E+03	0.0E+00	0.0E+00	1.3E+01	1.3E+01	0.0E+00	1.3E+01	1.5E+01	<1	1.3E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-128
MAXIMUM EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO FACILITY
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.0E+02	5.5E-01	0.0E+00	0.0E+00	5.5E-01	4.1E-01	9.6E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.6E+02	1.2E-01	0.0E+00	0.0E+00	1.2E-01	1.7E-01	2.9E-01	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+02	1.3E+00	0.0E+00	0.0E+00	1.3E+00	1.7E-01	1.4E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.7E-01	1.9E-04	0.0E+00	0.0E+00	1.9E-04	3.8E-04	5.6E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	3.2E+02	7.5E-01	0.0E+00	0.0E+00	7.5E-01	3.3E-01	1.1E+00	5.1E+00	<1	7.1E+00	<1
Chromium	2.9E+01	1.1E-02	0.0E+00	0.0E+00	1.1E-02	3.0E-02	4.1E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	5.3E+00	5.3E-03	0.0E+00	0.0E+00	5.3E-03	5.3E-03	1.1E-02	7.3E+00	<1	3.7E+01	<1
Copper	4.7E+02	1.1E+00	0.0E+00	0.0E+00	1.1E+00	4.8E-01	1.6E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.7E+03	1.7E+00	0.0E+00	0.0E+00	1.7E+00	5.8E+00	7.5E+00	3.4E+01	<1	8.0E+01	<1
Manganese	4.3E+02	5.4E+00	0.0E+00	0.0E+00	5.4E+00	4.3E-01	5.9E+00	8.8E+01	<1	2.8E+02	<1
Mercury	4.9E+01	1.5E-01	0.0E+00	0.0E+00	1.5E-01	4.9E-02	2.0E-01	1.3E+01	<1	5.6E+01	<1
Nickel	1.3E+01	3.7E-02	0.0E+00	0.0E+00	3.7E-02	1.3E-02	4.9E-02	6.0E+01	<1	8.0E+01	<1
Selenium	3.4E+01	1.2E+00	0.0E+00	0.0E+00	1.2E+00	3.5E-02	1.3E+00	3.5E-01	**3.7**	1.1E+00	**1.2**
Silver	2.1E+01	4.3E-01	0.0E+00	0.0E+00	4.3E-01	2.2E-02	4.5E-01	4.4E+01	<1	2.2E+02	<1
Thallium	4.0E-01	8.2E-05	0.0E+00	0.0E+00	8.2E-05	4.1E-04	4.9E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	2.4E-03	0.0E+00	0.0E+00	2.4E-03	8.8E-03	1.1E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.5E+04	5.3E+01	0.0E+00	0.0E+00	5.3E+01	1.5E+01	6.8E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-129
MEAN EXPOSURE ESTIMATE - GROUNDHOG
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Groundhog Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	6.0E+01	9.3E-02	0.0E+00	0.0E+00	9.3E-02	6.1E-02	1.5E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	2.4E+01	4.1E-02	0.0E+00	0.0E+00	4.1E-02	2.4E-02	6.5E-02	5.7E+00	<1	1.2E+01	<1
Barium	3.3E+01	2.5E-01	0.0E+00	0.0E+00	2.5E-01	3.3E-02	2.8E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	1.1E-01	5.7E-05	0.0E+00	0.0E+00	5.7E-05	1.1E-04	1.7E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	4.5E+01	2.5E-01	0.0E+00	0.0E+00	2.5E-01	4.6E-02	3.0E-01	5.1E+00	<1	7.1E+00	<1
Chromium	1.1E+01	4.1E-03	0.0E+00	0.0E+00	4.1E-03	1.1E-02	1.5E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	2.1E+00	2.1E-03	0.0E+00	0.0E+00	2.1E-03	2.1E-03	4.2E-03	7.3E+00	<1	3.7E+01	<1
Copper	8.8E+01	5.7E-01	0.0E+00	0.0E+00	5.7E-01	9.0E-02	6.6E-01	1.2E+01	<1	1.5E+01	<1
Lead	8.0E+02	5.7E-01	0.0E+00	0.0E+00	5.7E-01	8.1E-01	1.4E+00	3.4E+01	<1	8.0E+01	<1
Manganese	6.7E+01	8.5E-01	0.0E+00	0.0E+00	8.5E-01	6.8E-02	9.2E-01	8.8E+01	<1	2.8E+02	<1
Mercury	7.5E+00	5.5E-02	0.0E+00	0.0E+00	5.5E-02	7.6E-03	6.3E-02	1.3E+01	<1	5.6E+01	<1
Nickel	4.5E+00	1.7E-02	0.0E+00	0.0E+00	1.7E-02	4.6E-03	2.2E-02	6.0E+01	<1	8.0E+01	<1
Selenium	5.1E+00	1.6E-01	0.0E+00	0.0E+00	1.6E-01	5.2E-03	1.6E-01	3.5E-01	<1	1.1E+00	<1
Silver	3.4E+00	7.0E-02	0.0E+00	0.0E+00	7.0E-02	3.5E-03	7.3E-02	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E-01	3.0E-05	0.0E+00	0.0E+00	3.0E-05	1.5E-04	1.8E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	5.0E+00	1.4E-03	0.0E+00	0.0E+00	1.4E-03	5.1E-03	6.5E-03	5.9E+00	<1	8.3E+00	<1
Zinc	4.0E+03	2.6E+01	0.0E+00	0.0E+00	2.6E+01	4.1E+00	3.0E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-130
MAXIMUM EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	1.1E-01	0.0E+00	0.0E+00	1.1E-01	8.0E-02	1.9E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.6E+02	3.5E-02	0.0E+00	0.0E+00	3.5E-02	4.8E-02	8.3E-02	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+02	3.7E-01	0.0E+00	0.0E+00	3.7E-01	4.9E-02	4.1E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.7E-01	5.4E-05	0.0E+00	0.0E+00	5.4E-05	1.1E-04	1.6E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	3.2E+02	2.2E-01	0.0E+00	0.0E+00	2.2E-01	9.4E-02	3.1E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.9E+01	3.2E-03	0.0E+00	0.0E+00	3.2E-03	8.6E-03	1.2E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	4.0E+00	1.2E-03	0.0E+00	0.0E+00	1.2E-03	1.2E-03	2.3E-03	7.3E+00	<1	3.7E+01	<1
Copper	4.7E+02	3.2E-01	0.0E+00	0.0E+00	3.2E-01	1.4E-01	4.5E-01	1.2E+01	<1	1.5E+01	<1
Lead	5.7E+03	4.9E-01	0.0E+00	0.0E+00	4.9E-01	1.7E+00	2.2E+00	3.4E+01	<1	8.0E+01	<1
Manganese	4.3E+02	1.6E+00	0.0E+00	0.0E+00	1.6E+00	1.3E-01	1.7E+00	8.8E+01	<1	2.8E+02	<1
Mercury	2.1E+01	2.8E-02	0.0E+00	0.0E+00	2.8E-02	6.1E-03	3.4E-02	1.3E+01	<1	5.6E+01	<1
Nickel	9.5E+00	8.6E-03	0.0E+00	0.0E+00	8.6E-03	2.8E-03	1.1E-02	6.0E+01	<1	8.0E+01	<1
Selenium	9.6E+00	8.9E-02	0.0E+00	0.0E+00	8.9E-02	2.8E-03	9.2E-02	3.5E-01	<1	1.1E+00	<1
Silver	2.1E+01	1.2E-01	0.0E+00	0.0E+00	1.2E-01	6.2E-03	1.3E-01	4.4E+01	<1	2.2E+02	<1
Thallium	3.4E-01	2.0E-05	0.0E+00	0.0E+00	2.0E-05	1.0E-04	1.2E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	7.0E-04	0.0E+00	0.0E+00	7.0E-04	2.5E-03	3.2E-03	5.9E+00	<1	8.3E+00	<1
Zinc	1.0E+04	1.2E+01	0.0E+00	0.0E+00	1.2E+01	2.9E+00	1.5E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-131
MEAN EXPOSURE ESTIMATE - WHITE-TAILED DEER
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	White-tailed Deer Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	2.2E-02	0.0E+00	0.0E+00	2.2E-02	1.4E-02	3.6E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	3.4E+01	1.4E-02	0.0E+00	0.0E+00	1.4E-02	1.0E-02	2.4E-02	5.7E+00	<1	1.2E+01	<1
Barium	4.1E+01	9.0E-02	0.0E+00	0.0E+00	9.0E-02	1.2E-02	1.0E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	1.1E-01	1.6E-05	0.0E+00	0.0E+00	1.6E-05	3.2E-05	4.7E-05	5.3E-01	<1	2.7E+00	<1
Cadmium	5.9E+01	8.5E-02	0.0E+00	0.0E+00	8.5E-02	1.7E-02	1.0E-01	5.1E+00	<1	7.1E+00	<1
Chromium	9.9E+00	1.1E-03	0.0E+00	0.0E+00	1.1E-03	2.9E-03	4.0E-03	7.4E+00	<1	3.7E+01	<1
Cobalt	1.7E+00	4.9E-04	0.0E+00	0.0E+00	4.9E-04	4.9E-04	9.7E-04	7.3E+00	<1	3.7E+01	<1
Copper	9.3E+01	1.7E-01	0.0E+00	0.0E+00	1.7E-01	2.7E-02	2.0E-01	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+03	2.0E-01	0.0E+00	0.0E+00	2.0E-01	3.4E-01	5.4E-01	3.4E+01	<1	8.0E+01	<1
Manganese	9.5E+01	3.5E-01	0.0E+00	0.0E+00	3.5E-01	2.8E-02	3.7E-01	8.8E+01	<1	2.8E+02	<1
Mercury	3.9E+00	1.1E-02	0.0E+00	0.0E+00	1.1E-02	1.2E-03	1.2E-02	1.3E+01	<1	5.6E+01	<1
Nickel	3.9E+00	4.4E-03	0.0E+00	0.0E+00	4.4E-03	1.1E-03	5.5E-03	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+00	1.9E-02	0.0E+00	0.0E+00	1.9E-02	7.0E-04	2.0E-02	3.5E-01	<1	1.1E+00	[illegible]
Silver	4.2E+00	2.5E-02	0.0E+00	0.0E+00	2.5E-02	1.2E-03	2.6E-02	4.4E+01	<1	2.2E+02	<1
Thallium	1.4E-01	8.2E-06	0.0E+00	0.0E+00	8.2E-06	4.1E-05	4.9E-05	2.0E-01	<1	1.0E+00	<1
Vanadium	5.0E+00	4.0E-04	0.0E+00	0.0E+00	4.0E-04	1.5E-03	1.9E-03	5.9E+00	<1	8.3E+00	<1
Zinc	2.9E+03	6.1E+00	0.0E+00	0.0E+00	6.1E+00	8.4E-01	7.0E+00	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-132
MAXIMUM EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	8.5E-01	3.1E+01	0.0E+00	3.1E+01	1.5E+00	3.3E+01	1.3E+01	**2.5**	6.7E+01	<1
Arsenic	1.6E+02	2.7E-01	9.6E-01	0.0E+00	1.2E+00	8.8E-01	2.1E+00	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+02	2.8E+00	1.7E+00	0.0E+00	4.5E+00	8.9E-01	5.4E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.7E-01	4.1E-04	1.9E-03	0.0E+00	2.3E-03	2.0E-03	4.3E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.2E+02	1.7E+00	8.2E+01	0.0E+00	8.4E+01	1.7E+00	8.6E+01	5.1E+00	**16.8**	7.1E+00	**12.0**
Chromium	2.9E+01	2.5E-02	1.0E+00	0.0E+00	1.0E+00	1.6E-01	1.2E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	4.0E+00	8.9E-03	5.4E-02	0.0E+00	6.3E-02	2.1E-02	8.5E-02	7.3E+00	<1	3.7E+01	<1
Copper	4.7E+02	2.4E+00	3.0E+00	0.0E+00	5.4E+00	2.5E+00	8.0E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.7E+03	3.8E+00	1.0E+02	0.0E+00	1.0E+02	3.1E+01	1.3E+02	3.4E+01	**4.0**	8.0E+01	**1.7**
Manganese	4.3E+02	1.2E+01	3.1E+00	0.0E+00	1.5E+01	2.3E+00	1.7E+01	8.8E+01	<1	2.8E+02	<1
Mercury	2.1E+01	2.1E-01	3.3E-01	0.0E+00	5.4E-01	1.1E-01	6.5E-01	1.3E+01	<1	5.6E+01	<1
Nickel	9.5E+00	6.6E-02	1.1E+00	0.0E+00	1.2E+00	5.1E-02	1.2E+00	6.0E+01	<1	8.0E+01	<1
Selenium	9.6E+00	6.8E-01	5.4E-01	0.0E+00	1.2E+00	5.1E-02	1.3E+00	3.5E-01	**3.6**	1.1E+00	**1.2**
Silver	2.1E+01	9.5E-01	4.9E+00	0.0E+00	5.8E+00	1.1E-01	6.0E+00	4.4E+01	<1	2.2E+02	<1
Thallium	3.4E-01	1.5E-04	3.8E-02	0.0E+00	3.9E-02	1.8E-03	4.0E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	5.3E-03	4.1E-02	0.0E+00	4.6E-02	4.6E-02	9.2E-02	5.9E+00	<1	8.3E+00	<1
Zinc	1.0E+04	9.5E+01	2.0E+02	0.0E+00	2.9E+02	5.4E+01	3.5E+02	1.6E+02	**2.2**	3.2E+02	**1.1**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-133
MEAN EXPOSURE ESTIMATE - DEER MOUSE
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Deer Mouse Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	1.7E-01	5.4E+00	0.0E+00	5.6E+00	2.6E-01	5.8E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	3.4E+01	1.1E-01	3.2E-01	0.0E+00	4.3E-01	1.8E-01	6.1E-01	5.7E+00	<1	1.2E+01	<1
Barium	4.1E+01	6.9E-01	4.2E-01	0.0E+00	1.1E+00	2.2E-01	1.3E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	1.1E-01	1.2E-04	5.4E-04	0.0E+00	6.6E-04	5.8E-04	1.2E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	5.9E+01	6.5E-01	2.7E+01	0.0E+00	2.7E+01	3.2E-01	2.8E+01	5.1E+00	**5.4**	7.1E+00	**3.9**
Chromium	9.9E+00	8.3E-03	3.4E-01	0.0E+00	3.5E-01	5.3E-02	4.0E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	1.7E+00	3.7E-03	2.3E-02	0.0E+00	2.6E-02	8.9E-03	3.5E-02	7.3E+00	<1	3.7E+01	<1
Copper	9.3E+01	1.3E+00	2.0E+00	0.0E+00	3.3E+00	5.0E-01	3.8E+00	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+03	1.5E+00	2.7E+01	0.0E+00	2.9E+01	6.2E+00	3.5E+01	3.4E+01	**1.0**	8.0E+01	<1
Manganese	9.5E+01	2.6E+00	1.1E+00	0.0E+00	3.8E+00	5.1E-01	4.3E+00	8.8E+01	<1	2.8E+02	<1
Mercury	3.9E+00	8.6E-02	1.9E-01	0.0E+00	2.8E-01	2.1E-02	3.0E-01	1.3E+01	<1	5.6E+01	<1
Nickel	3.9E+00	3.4E-02	4.6E-01	0.0E+00	4.9E-01	2.1E-02	5.2E-01	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+00	1.5E-01	2.0E-01	0.0E+00	3.4E-01	1.3E-02	3.6E-01	3.5E-01	**1.0**	1.1E+00	<1
Silver	4.2E+00	1.9E-01	9.7E-01	0.0E+00	1.2E+00	2.3E-02	1.2E+00	4.4E+01	<1	2.2E+02	<1
Thallium	1.4E-01	6.2E-05	1.6E-02	0.0E+00	1.6E-02	7.5E-04	1.6E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	5.0E+00	3.1E-03	2.3E-02	0.0E+00	2.6E-02	2.7E-02	5.3E-02	5.9E+00	<1	8.3E+00	<1
Zinc	2.9E+03	4.7E+01	1.3E+02	0.0E+00	1.8E+02	1.5E+01	1.9E+02	1.6E+02	**1.2**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-134
MAXIMUM EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.0E+02	0.0E+00	5.4E+01	0.0E+00	5.4E+01	7.0E+00	6.1E+01	1.3E+01	**4.6**	6.7E+01	<1
Arsenic	1.6E+02	0.0E+00	1.1E+00	0.0E+00	1.1E+00	2.8E+00	4.0E+00	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+02	0.0E+00	2.0E+00	0.0E+00	2.0E+00	2.9E+00	4.9E+00	5.2E+01	<1	2.6E+02	<1
Beryllium	3.7E-01	0.0E+00	2.2E-03	0.0E+00	2.2E-03	6.4E-03	8.7E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	3.2E+02	0.0E+00	9.8E+01	0.0E+00	9.8E+01	5.6E+00	1.0E+02	5.1E+00	**20.4**	7.1E+00	**14.6**
Chromium	2.9E+01	0.0E+00	1.2E+00	0.0E+00	1.2E+00	5.1E-01	1.7E+00	7.4E+00	<1	3.7E+01	<1
Cobalt	5.3E+00	0.0E+00	8.6E-02	0.0E+00	8.6E-02	9.2E-02	1.8E-01	7.3E+00	<1	3.7E+01	<1
Copper	4.7E+02	0.0E+00	3.6E+00	0.0E+00	3.6E+00	8.2E+00	1.2E+01	1.2E+01	**1.0**	1.5E+01	<1
Lead	5.7E+03	0.0E+00	1.2E+02	0.0E+00	1.2E+02	1.0E+02	2.2E+02	3.4E+01	**6.5**	8.0E+01	**2.7**
Manganese	4.3E+02	0.0E+00	3.7E+00	0.0E+00	3.7E+00	7.5E+00	1.1E+01	8.8E+01	<1	2.8E+02	<1
Mercury	4.9E+01	0.0E+00	5.2E-01	0.0E+00	5.2E-01	8.5E-01	1.4E+00	1.3E+01	<1	5.6E+01	<1
Nickel	1.3E+01	0.0E+00	1.8E+00	0.0E+00	1.8E+00	2.2E-01	2.0E+00	6.0E+01	<1	8.0E+01	<1
Selenium	3.4E+01	0.0E+00	1.6E+00	0.0E+00	1.6E+00	5.9E-01	2.2E+00	3.5E-01	**6.4**	1.1E+00	**2.1**
Silver	2.1E+01	0.0E+00	5.8E+00	0.0E+00	5.8E+00	3.7E-01	6.2E+00	4.4E+01	<1	2.2E+02	<1
Thallium	4.0E-01	0.0E+00	5.4E-02	0.0E+00	5.4E-02	7.0E-03	6.1E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	0.0E+00	4.9E-02	0.0E+00	4.9E-02	1.5E-01	2.0E-01	5.9E+00	<1	8.3E+00	<1
Zinc	1.5E+04	0.0E+00	2.7E+02	0.0E+00	2.7E+02	2.6E+02	5.3E+02	1.6E+02	**3.3**	3.2E+02	**1.6**

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-135
MEAN EXPOSURE ESTIMATE - SHORT-TAILED SHREW
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS (0-2 FEET)
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Short-tailed Shrew Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	6.0E+01	0.0E+00	8.0E+00	0.0E+00	8.0E+00	1.0E+00	9.1E+00	1.3E+01	<1	6.7E+01	<1
Arsenic	2.4E+01	0.0E+00	3.0E-01	0.0E+00	3.0E-01	4.2E-01	7.2E-01	5.7E+00	<1	1.2E+01	<1
Barium	3.3E+01	0.0E+00	4.0E-01	0.0E+00	4.0E-01	5.7E-01	9.7E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	1.1E-01	0.0E+00	6.8E-04	0.0E+00	6.8E-04	2.0E-03	2.6E-03	5.3E-01	<1	2.7E+00	<1
Cadmium	4.5E+01	0.0E+00	2.7E+01	0.0E+00	2.7E+01	7.8E-01	2.8E+01	5.1E+00	**5.4**	7.1E+00	**3.9**
Chromium	1.1E+01	0.0E+00	4.4E-01	0.0E+00	4.4E-01	1.9E-01	6.3E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	2.1E+00	0.0E+00	3.4E-02	0.0E+00	3.4E-02	3.6E-02	7.0E-02	7.3E+00	<1	3.7E+01	<1
Copper	8.8E+01	0.0E+00	2.3E+00	0.0E+00	2.3E+00	1.5E+00	3.9E+00	1.2E+01	<1	1.5E+01	<1
Lead	8.0E+02	0.0E+00	2.4E+01	0.0E+00	2.4E+01	1.4E+01	3.8E+01	3.4E+01	**1.1**	8.0E+01	<1
Manganese	6.7E+01	0.0E+00	1.1E+00	0.0E+00	1.1E+00	1.2E+00	2.2E+00	8.8E+01	<1	2.8E+02	<1
Mercury	7.5E+00	0.0E+00	2.8E-01	0.0E+00	2.8E-01	1.3E-01	4.1E-01	1.3E+01	<1	5.6E+01	<1
Nickel	4.5E+00	0.0E+00	6.5E-01	0.0E+00	6.5E-01	7.9E-02	7.2E-01	6.0E+01	<1	8.0E+01	<1
Selenium	5.1E+00	0.0E+00	4.1E-01	0.0E+00	4.1E-01	8.9E-02	5.0E-01	3.5E-01	**1.4**	1.1E+00	<1
Silver	3.4E+00	0.0E+00	9.4E-01	0.0E+00	9.4E-01	6.0E-02	1.0E+00	4.4E+01	<1	2.2E+02	<1
Thallium	1.5E-01	0.0E+00	2.0E-02	0.0E+00	2.0E-02	2.6E-03	2.2E-02	2.0E-01	<1	1.0E+00	<1
Vanadium	5.0E+00	0.0E+00	2.8E-02	0.0E+00	2.8E-02	8.7E-02	1.1E-01	5.9E+00	<1	8.3E+00	<1
Zinc	4.0E+03	0.0E+00	1.8E+02	0.0E+00	1.8E+02	7.0E+01	2.5E+02	1.6E+02	**1.5**	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-136
MAXIMUM EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Max Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	2.7E+02	2.5E-02	0.0E+00	1.6E-03	2.6E-02	2.5E-01	2.7E-01	1.3E+01	<1	6.7E+01	<1
Arsenic	1.6E+02	7.7E-03	0.0E+00	1.5E-02	2.3E-02	1.5E-01	1.7E-01	5.7E+00	<1	1.2E+01	<1
Barium	1.7E+02	8.1E-02	0.0E+00	2.7E-01	3.6E-01	1.5E-01	5.1E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	3.7E-01	1.2E-05	0.0E+00	1.1E-07	1.2E-05	3.4E-04	3.5E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	3.2E+02	4.8E-02	0.0E+00	1.6E-01	2.1E-01	2.9E-01	5.1E-01	5.1E+00	<1	7.1E+00	<1
Chromium	2.9E+01	7.1E-04	0.0E+00	8.1E-02	8.1E-02	2.7E-02	1.1E-01	7.4E+00	<1	3.7E+01	<1
Cobalt	4.0E+00	2.6E-04	0.0E+00	2.4E-03	2.6E-03	3.6E-03	6.3E-03	7.3E+00	<1	3.7E+01	<1
Copper	4.7E+02	7.0E-02	0.0E+00	7.2E-01	7.9E-01	4.3E-01	1.2E+00	1.2E+01	<1	1.5E+01	<1
Lead	5.7E+03	1.1E-01	0.0E+00	1.4E+00	1.5E+00	5.2E+00	6.7E+00	3.4E+01	<1	8.0E+01	<1
Manganese	4.3E+02	3.5E-01	0.0E+00	1.3E-03	3.5E-01	3.9E-01	7.4E-01	8.8E+01	<1	2.8E+02	<1
Mercury	2.1E+01	6.2E-03	0.0E+00	3.3E-02	3.9E-02	1.9E-02	5.8E-02	1.3E+01	<1	5.6E+01	<1
Nickel	9.5E+00	1.9E-03	0.0E+00	6.5E-02	6.7E-02	8.6E-03	7.6E-02	6.0E+01	<1	8.0E+01	<1
Selenium	9.6E+00	2.0E-02	0.0E+00	4.5E-02	6.5E-02	8.7E-03	7.3E-02	3.5E-01	<1	1.1E+00	<1
Silver	2.1E+01	2.8E-02	0.0E+00	7.5E-04	2.8E-02	1.9E-02	4.8E-02	4.4E+01	<1	2.2E+02	<1
Thallium	3.4E-01	4.5E-06	0.0E+00	1.1E-03	1.1E-03	3.1E-04	1.4E-03	2.0E-01	<1	1.0E+00	<1
Vanadium	8.6E+00	1.5E-04	0.0E+00	3.5E-06	1.6E-04	7.8E-03	8.0E-03	5.9E+00	<1	8.3E+00	<1
Zinc	1.0E+04	2.7E+00	0.0E+00	5.0E+00	7.8E+00	9.1E+00	1.7E+01	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_i) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available

TABLE F-137
MEAN EXPOSURE ESTIMATE - RED FOX
NATURAL AREA BUFFER ZONE 50-FOOT LOCATIONS
DuPONT EAST CHICAGO SITE
EAST CHICAGO, INDIANA

Metal	Exposure Point Concentration	Red fox Dose (mg/kg bw-day)					TRV (mg/kg bw-day)				
		Diet[a]				Substrate[c]	Unadjusted for Bioavailability				
	Mean Soil Concentration (mg/kg, dry weight)	Plant Material	Invertebrates	Small Mammals	$Dose_{diet}$	$Dose_{substrate}$	Total $Dose_{Unadjusted}$[d]	TRV_{NOAEL}	HQ	TRV_{LOAEL}	HQ
Antimony	4.8E+01	4.9E-03	0.0E+00	2.8E-04	5.1E-03	4.4E-02	4.9E-02	1.3E+01	<1	6.7E+01	<1
Arsenic	3.4E+01	3.2E-03	0.0E+00	4.1E-03	7.3E-03	3.1E-02	3.8E-02	5.7E+00	<1	1.2E+01	<1
Barium	4.1E+01	2.0E-02	0.0E+00	6.8E-02	8.8E-02	3.7E-02	1.3E-01	5.2E+01	<1	2.6E+02	<1
Beryllium	1.1E-01	3.5E-06	0.0E+00	3.1E-08	3.5E-06	9.8E-05	1.0E-04	5.3E-01	<1	2.7E+00	<1
Cadmium	5.9E+01	1.9E-02	0.0E+00	6.3E-02	8.2E-02	5.3E-02	1.4E-01	5.1E+00	<1	7.1E+00	<1
Chromium	9.9E+00	2.4E-04	0.0E+00	3.6E-02	3.7E-02	9.0E-03	4.6E-02	7.4E+00	<1	3.7E+01	<1
Cobalt	1.7E+00	1.1E-04	0.0E+00	1.0E-03	1.1E-03	1.5E-03	2.6E-03	7.3E+00	<1	3.7E+01	<1
Copper	9.3E+01	3.7E-02	0.0E+00	5.4E-01	5.8E-01	8.5E-02	6.6E-01	1.2E+01	<1	1.5E+01	<1
Lead	1.2E+03	4.5E-02	0.0E+00	6.1E-01	6.6E-01	1.0E+00	1.7E+00	3.4E+01	<1	8.0E+01	<1
Manganese	9.5E+01	7.7E-02	0.0E+00	2.8E-04	7.7E-02	8.6E-02	1.6E-01	8.8E+01	<1	2.8E+02	<1
Mercury	3.9E+00	2.5E-03	0.0E+00	6.3E-03	8.8E-03	3.6E-03	1.2E-02	1.3E+01	<1	5.6E+01	<1
Nickel	3.9E+00	9.8E-04	0.0E+00	4.3E-02	4.4E-02	3.5E-03	4.8E-02	6.0E+01	<1	8.0E+01	<1
Selenium	2.4E+00	4.3E-03	0.0E+00	2.7E-02	3.1E-02	2.2E-03	3.3E-02	3.5E-01	<1	1.1E+00	<1
Silver	4.2E+00	5.5E-03	0.0E+00	1.5E-04	5.6E-03	3.8E-03	9.5E-03	4.4E+01	<1	2.2E+02	<1
Thallium	1.4E-01	1.8E-06	0.0E+00	4.6E-04	4.6E-04	1.3E-04	5.9E-04	2.0E-01	<1	1.0E+00	<1
Vanadium	5.0E+00	8.9E-05	0.0E+00	2.0E-06	9.1E-05	4.5E-03	4.6E-03	5.9E+00	<1	8.3E+00	<1
Zinc	2.9E+03	1.4E+00	0.0E+00	4.6E+00	6.0E+00	2.6E+00	8.6E+00	1.6E+02	<1	3.2E+02	<1

Notes:

a, Dietary dose calculated as:

$$ADD_{diet} = \frac{IR_{diet} \times \sum (B[S]AF \times C_{substrate} \times DF_{i}) \times AUF}{BW}$$

b, Drinking water dose calculated as:

$$ADD_{water} = \frac{IR_{water} \times C_{water} \times AUF}{BW}$$

c, Substrate dose calculated as:

$$ADD_{substrate} = \frac{IR_{substrate} \times C_{substrate} \times AUF}{BW}$$

d, Total dose calculated as:

$$ADD_{total} = ADD_{diet} + ADD_{water} + ADD_{substrate}$$

where:
= Dose of COPC obtained from the diet (mg COPC/kg receptor body weight-day)
= Ingestion rate of food (kg food ingested per day, dry weight)
= Bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF), specific to prey type and COPC (kg substrate/kg food, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)
= Dietary fraction of food item *i* (proportion of food type in the diet)
= Area use factor includes seasonal use rates , area use rates, COPC assimilation rate
= Body weight of the receptor, wet weight (kg)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Ingestion rate of drinking water (L water ingested per day)
= COPC concentration in drinking water(mg COPC/L water)
= Dose of COPC obtained from drinking water (mg COPC/kg receptor body weight-day)
= Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)
= COPC concentration in substrate (mg COPC/kg substrate, dry weight)

NA, TRV was not available
--, HQ could not be calculated because TRV was not available o