19 November 2008

Proj. No.: C62720114
File Loc.: Calgary

Alberta Environment
1st Floor, Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta
T6B 2X3

Attention: Michelle Camilleri

Dear Michelle:

RE: ADDITIONAL SUPPLEMENTARY INFORMATION REQUESTS

This letter is written in response to additional Supplemental Information Requests (SIRs) dated October 7, 2008 that reflect the additional information needs that were recently communicated to Alberta Sulphur Terminals by Alberta Environment. For ease of reference, each additional SIR is repeated in full, in italics, and with the same numerical designation as in the original draft communication.

AIR

1. *Supplemental Information Request #2 Response 1, Pages 1 to 2*

   a) *Clarify if the height of the storage pile will ever exceed the height of the proposed windscreen barrier (6.1 m).*

   A. Under normal operating conditions, the height of the storage pile will not exceed the height of the proposed wind screen. The full stockpile is required in the relatively unlikely event that the rail or shipping services are interrupted for an extended period of time. Such an interruption could occur as a result of an extended strike or a damaging natural event (extreme storm, landslide or avalanche). In such a circumstance, AST will commit to maintaining the stockpile to a height of no greater than 10 m, and a timeframe of no more than 1 month.

WATER

2. *Supplemental Information Request #2 Response 8, Tables 8-1 and 8-2, Page 8*

   In Table 8-1 AST shows chlorine as an active chemical compound required in the cooling tower but this compound has not been included in the estimated blow down chemistry.

a) *Clarify why chlorine was not included in the estimated blow down chemistry. Update Table 8-2 as appropriate.*

A. In order to minimize the biological growth in a cooling tower, a biocide (chlorine) is added to the water to maintain a residual of approximately 2 mg/L of free chlorine. Hence, free chlorine will be present in the blow down chemistry at approximately 2 mg/L. This is slightly higher than the typical dosage of free chlorine in municipal tap water in Alberta (0.5 mg/L). The expected water quality in the blow down stream that will enter the storm water pond based on the water chemistry and chemical additions is described in the updated Table 8-2.

Table 2-1: Estimated Blow down Water Chemistry

Water Quality Parameters	Estimated Blow down Water Chemistry
Blow down temperature	85 ºF
Sodium	45.0 mg/L
Potassium	6.6 mg/L
Magnesium	79.2 mg/L
Calcium	268.8 mg/L
Hardness (as calcium carbonate)	996.6 mg/L
Chloride	20.4 mg/L
Sulphate	908.9 mg/L
Bicarbonate	60.9 mg/L
Carbonate	1.8 mg/L
Phosphate	8.5 mg/L
Silica dioxide	24 mg/L
Free Chlorine	2.0 mg/L
pH	8
Alkalinity	132.35 mg/L
Total dissolved solids	1500.0 mg/L

HEALTH

3. *Supplemental Information Request #2 Response 23a, Pages 27 to 30*
In Tables 23-1 and 23-2 AST provides comparisons of predicted mean metal concentrations for the Project as compared to measured concentrations in other areas of Alberta.

a) *In order to address potential cumulative effects present the predicted mean metal concentrations plus background.*

b) *Compare the results to corresponding exposure limits.*

c) Discuss the results.

Response to a, b, and c

Mean annual metal concentrations for the Project and background provided in SIR 23 have been evaluated further in this response. Air and soil concentrations are discussed separately. Due to limited information being available with respect to background air concentrations of metals in Alberta, data from Edmonton and High Level were used to characterize background concentrations. Metals have not been measured under the Fort Air Partnership monitoring program. Under the Clean Air Strategic Alliance (CASA), metals have been measured in the cities of Edmonton and Calgary, with no data available from the Bruderheim area. Alberta Health and Wellness did measure metals for its assessment of air quality in High Level (Alberta Health and Wellness 1999). Given that no site-specific data are available, the concentrations taken from Edmonton and High Level were adopted as estimates of background exposures for residents of the Bruderheim area.

AIR

In SIR 23a, measured concentrations of metals available from monitoring stations in High Level and Edmonton, Alberta were compared against the predicted Project annual concentrations. To address potential cumulative exposures, the highest mean annual background concentration (i.e., the most conservative measurement from either High Level or Edmonton) was added to the predicted mean annual concentration for the Project. These predicted cumulative air concentrations were then compared against regulatory-endorsed chronic inhalation exposure limits. A summary of the measured, predicted and cumulative concentrations are provided in Table 3-1.

Table 3-1: Comparison of Project, Background and Cumulative Air Concentrations

	Project	Background[1]		Evaluation of Potential Cumulative Exposures		
Metals	AST, Predicted Mean Annual Concentration, (µg/m^3)	Edmonton Central, Mean Annual Concentration, (µg/m^3)	High Level, Mean Annual Concentration, (µg/m^3)	Cumulative (Project + Maximum Mean Background), (µg/m^3)	Chronic Inhalation Exposure Limit (µg/m^3)	Reference
arsenic	1.8E-05	**1.0E-03**	1.7E-04	1.0E-03	1.6E-03	CEPA 1993
cadmium	1.6E-05	**3.4E-04**	2.0E-05	3.6E-04	6.0E-03	USEPA 1982
chromium	6.6E-06	**6.3E-03**	1.1E-04	6.3E-03	6.0E+01	RIVM 2001
copper	4.5E-05	**1.2E-02**	8.2E-04	1.2E-02	1.0E+00	RIVM 2001
lead	9.1E-05	**7.1E-03**	6.2E-04	7.2E-03	5.0E-01	WHO 2000
manganese	3.4E-05	**1.8E-02**	4.3E-03	1.8E-02	4.0E-02	ATSDR 2000
mercury	2.2E-05	**8.8E-04**	--	9.0E-03	3.0E-01	USEPA 1995
nickel	4.3E-05	2.7E-03	**3.0E-03**	3.1E-03	7.7E-03	Health Canada 2004
selenium	2.4E-05	**3.3E-04**	--	3.5E-04	7.0E-01	ACGIH 1991,2006

Metals	Project	Background[1]		Evaluation of Potential Cumulative Exposures		
	AST, Predicted Mean Annual Concentration, (µg/m^3)	Edmonton Central, Mean Annual Concentration, (µg/m^3)	High Level, Mean Annual Concentration, (µg/m^3)	Cumulative (Project + Maximum Mean Background), (µg/m^3)	Chronic Inhalation Exposure Limit (µg/m^3)	Reference
zinc	2.5E-04	**1.5E-02**	6.3E-03	1.5E-02	7.0E+01	ACGIH 1991,2006

Note:
[1] Values in **bold** represent the highest measured background concentration (from either Edmonton Central or High Level) that was added to predicted air concentrations from the AST Project to determine potential cumulative inhalation exposures.

The chronic inhalation exposure limits presented in Table 3-1 were selected through a hierarchical approach. In general, limits were selected that met the following criteria:

- protective of the health of the general public based on the current scientific understanding of the critical toxicological effects of the metal;
- protective of sensitive individuals, including children and the elderly, through the application of safety and uncertainty factors;
- established or recommended by reputable scientific authorities; and
- supported by adequate documentation.

The sources of inhalation exposure limits included the regulatory agencies outlined by Health Canada (2004a) in the "Federal Contaminated Site Risk Assessment in Canada":

- the chronic MRLs developed by the ATSDR (2006);
- the Toxicological Reference Values (TRVs) developed by Health Canada (2004b,c);
- the Maximum Permissible Risk Levels developed by the Netherlands National Institute of Public Health and the Environment (RIVM 2001);
- the Integrated Risk Information System (IRIS) provided by the United States Environmental Protection Agency (U.S. EPA 2008); and
- the Air Quality Guidelines for Europe (Second Edition) developed by the WHO (2000).

In the event that an exposure limit was not available from one of the above regulatory agencies, the search was expanded to include:

- the chronic reference exposure levels (RELs) developed by the OEHHA (2008b); and
- the time-weighted average TLVs developed by the ACGIH (2006a).

All predicted cumulative (background + project) air concentrations of metals are less than their chronic inhalation exposure limits, suggesting that lifetime exposure to the predicted cumulative air concentrations are not anticipated to be associated with adverse health impacts. The comparison in Table 3-1 reveals that background exposures contributed the most risk to

cumulative exposures, given the small magnitude of change that is apparent between the cumulative and background concentrations. Incremental changes in air concentrations attributable to the Project ranged from 0 – 7% of measured background concentrations, and were all well below chronic inhalation exposure limits.

SOIL

A comparison of predicted soil concentrations associated with potential metal emissions from the Project with the available measured background soil data from the Fort Saskatchewan area was originally presented in our response to SIR 23.

To address potential cumulative exposures, the highest mean soil concentration of each metal was added to the predicted soil concentration associated with emissions of metals from the Project. These predicted cumulative soil concentrations were then compared against Alberta Environment Tier 1 soil quality guidelines. A summary of the measured, predicted and cumulative concentrations are provided in Table 3-2.

Table 3-2: Comparison of Predicted, Measured and Cumulative Soil Concentrations

Metal	AST Project, Predicted Soil Concentration (mg/kg)	Background Measured Soil (mg/kg), TOTAL upgrader (TOTAL 2007)	Background Measured Soil (mg/kg), Statoil Hydro upgrader (Statoil 2007)	Predicted Cumulative Soil Concentration, mg/kg (Background + Project)	AENV Tier 1 SQG 2007 (mg/kg)
arsenic	1.4E-02	3.7E+00	**4.6E+00**	4.6E+00	1.7E+01
cadmium	1.3E-02	<5.0E-01	**4.3E-01**	4.4E-01	1.4E+00
chromium	5.2E-03	9.5E+00	**1.9E+01**	1.9E+01	6.4E+01
copper	3.5E-02	1.0E+01	**9.0E+01**	9.0E+01	6.3E+01
lead	7.2E-02	7.3E+00	**1.1E+01**	1.1E+01	7.0E+01
manganese	2.7E-02	ND	ND	2.7E-02	NA
mercury	1.7E-02	**3.0E-02**	3.0E-02	4.7E-02	6.6E+00
nickel	3.4E-02	2.0E+01	**2.1E+01**	2.1E+01	5.0E+01
selenium	1.9E-02	3.0E-01	**3.3E-01**	3.5E-01	1.0E+00
zinc	1.9E-01	6.0E+01	**1.4E+02**	1.4E+02	2.0E+02

Notes:
ND: no data available.
NA: not available.
1 Values in bold represent the highest measured mean background concentration out of the two upgrader soil data sets evaluated that was used to estimate cumulative exposures.

As shown, the estimated cumulative soil concentrations (background + project) are below Alberta Tier 1 guidelines for all metals. The estimated soil concentrations are not expected to result in adverse health effects to the area residents. Further, the incremental change between the

cumulative and background concentrations is minimal, with existing soil concentrations contributing the most to the cumulative case.

4. *Supplemental Information Request #2 Response 24a, Page 30*
AST was asked to provide a cumulative assessment. AST responded that an updated assessment was provided in Attachment 2.

a) Explain why SO2, NO2, PM2.5 and H2S were not included in the cumulative assessment.

b) Update the Human Health Risk Assessment (HHRA) accordingly.

Response to a, and b.

The outlined contaminants, SO_2, NO_2, $PM_{2.5}$ and H_2S, were not included in the initial cumulative assessment as their predicted ground level concentrations were very low relative to the applicable Ambient Air Quality Objectives.

A revised assessment has been completed for SO_2, NO_2, $PM_{2.5}$ and H_2S. The emission sources (e.g., industrial and community) included in the baseline, application and cumulative cases for the Criteria Air Contaminants (CACs) and hydrogen sulphide (H_2S) in this update are the same as those provided for the non-CACs in the HHRA update.

The acute and chronic exposure limits used for the revised CAC assessment are consistent with those described in the original EIA (Hazco 2007).

Acute Inhalation Assessment

Tables 4-1 to 4-4 present the acute risk quotients (RQs) for the four CACs and H_2S in the baseline, application, and cumulative cases for each of the four receptor locations. The four locations include a residential site in the vicinity of the Project, the town of Bruderheim and Lamont, and a hypothetical location expected to "see the greatest influence" from the Project with respect to potential air quality changes (i.e., "maximum ground level air concentration" (GLAC) location). For further information on receptor locations, please refer to the HHRA update that was provided as part of the previous SIR responses package (i.e., Attachment 2).

Table 4-1: Summary of Acute Risk Quotients for the Residential Receptor

	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
CO	1hr	1.1E-01	1.1E-01	1.1E-01
	8hr	2.4E-01	2.4E-01	2.4E-01
H_2S	1hr	1.6E-02	1.6E-02	4.1E-02
NO_2	1hr	3.2E-01	3.2E-01	3.2E-01
	24hr	4.7E-01	4.7E-01	4.7E-01
SO_2	1hr	2.0E-01	2.0E-01	3.7E-01
	24hr	1.7E-01	1.7E-01	2.5E-01
$PM_{2.5}$	24hr	2.4E-01	2.4E-01	2.6E-01

Table 4-2: Summary of Acute Risk Quotients for the Bruderheim Receptor

	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
CO	1hr	1.3E-01	1.3E-01	1.3E-01
	8hr	2.8E-01	2.8E-01	2.8E-01
H_2S	1hr	1.6E-02	1.6E-02	7.2E-02
NO_2	1hr	3.3E-01	3.3E-01	3.4E-01
	24hr	4.9E-01	4.9E-01	4.9E-01
SO_2	1hr	1.8E-01	1.8E-01	3.0E-01
	24hr	1.6E-01	1.6E-01	3.0E-01
$PM_{2.5}$	24hr	2.9E-01	2.9E-01	3.1E-01

Table 4-3: Summary of Acute Risk Quotients for the Lamont Receptor

	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
CO	1hr	1.6E-01	1.6E-01	1.6E-01
	8hr	3.6E-01	3.6E-01	3.6E-01
H_2S	1hr	6.7E-03	6.9E-03	3.0E-02
NO_2	1hr	3.6E-01	3.6E-01	3.6E-01
	24hr	5.3E-01	5.3E-01	5.3E-01
SO_2	1hr	1.0E-01	1.0E-01	1.9E-01
	24hr	9.2E-02	9.2E-02	1.9E-01
$PM_{2.5}$	24hr	3.3E-01	3.3E-01	3.3E-01

Table 4-4: Summary of Acute Risk Quotients for the Maximum GLAC Location

	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
CO	1hr	1.3E-01	1.3E-01	1.3E-01
	8hr	3.1E-01	3.2E-01	3.2E-01
H_2S	1hr	1.0E-02	1.2E-02	4.3E-02
NO_2	1hr	3.4E-01	3.9E-01	3.9-01
	24hr	5.0E-01	5.1E-01	5.1E-01
SO_2	1hr	1.4E-01	1.4E-01	2.5E-01
	24hr	1.1E-01	1.1E-01	2.0E-01

	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
$PM_{2.5}$	24hr	2.9E-01	3.5E-01	3.6E-01

No exceedances of the acute exposure limits were predicted for any of the compounds in the baseline, application or cumulative assessment cases.

Chronic Inhalation Assessment

Tables 4-5 to 4-8 present the chronic risk quotients (RQs) for the baseline, application and cumulative cases for each of the four receptor locations.

Table 4-5: Summary of Chronic Risk Quotients for the Residential Receptor

Chronic	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
H_2S	annual	3.6E-02	3.7E-02	1.9E-01
NO_2	annual	4.9E-01	4.9E-01	5.6E-01
SO_2	annual	1.6E-01	1.6E-01	2.6E-01
$PM_{2.5}$	annual	1.7E-01	1.7E-01	1.9E-01

Table 4-6: Summary of Chronic Risk Quotients for the Bruderheim Receptor

Chronic	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
H_2S	annual	4.0E-02	4.1E-02	4.2E-01
NO_2	annual	6.8E-01	6.8E-01	7.6E-01
SO_2	annual	1.3E-01	1.3E-01	2.3E-01
$PM_{2.5}$	annual	2.1E-01	2.2E-01	2.5E-01

Table 4-7: Summary of Chronic Risk Quotients for the Lamont Receptor

Chronic	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
H_2S	annual	1.6E-02	1.8E-02	1.1E-01
NO_2	annual	7.0E-01	7.0E-01	7.5E-01
SO_2	annual	9.6E-02	9.6E-02	1.6E-01
$PM_{2.5}$	annual	2.2E-01	2.2E-01	2.4E-01

Table 4-8: Summary of Chronic Risk Quotients for the Maximum GLAC Location

Chronic	Averaging Period	Assessment Case		
		Baseline	Application	Cumulative
H_2S	annual	2.4E-02	4.5E-02	2.0E-01
NO_2	annual	6.5E-01	6.8E-01	7.4E-01
SO_2	annual	1.0E-01	1.0E-01	1.8E-01
$PM_{2.5}$	annual	2.0E-01	2.5E-01	2.7E-01

No exceedances of the chronic exposure limits were observed for any of the CACs or H_2S in the baseline, application or cumulative assessment cases.

Mixtures Assessment

As changes have been made to the baseline, application and cumulative air concentrations for the CACs and H_2S, the chemical mixtures assessment has also been revised to incorporate the revised RQ values. For further information on the chemical mixtures and mixture components, please refer to the HHRA update provided as part of the previous SIR response package. The VOCs included in the HHRA update are included in the mixture assessment within this revised assessment for completeness and consistency. Mixture risk estimates are not presented for the maximum GLACs due to the unlikelihood of maximum air concentrations occurring at the same hypothetical location at exactly the same time for each of the compounds in the mixtures. Please note as well that only those mixtures to which the CACs and H_2S contribute are presented. In the case of the acute mixtures this involves the respiratory irritants, while for the chronic mixtures this involves the nasal and respiratory irritants.

Acute Mixtures Assessment

Revised acute mixture RQ values are provided in Tables 4-9 to 4-11.

Table 4-9: Revised Acute Chemical Mixture Risk Quotients for the Residential Receptor

	Assessment Case		
	Baseline	Application	Cumulative
Respiratory irritants	6.1E-01	6.1E-01	8.1E-01

Table 4-10: Revised Acute Chemical Mixture Risk Quotients for the Bruderheim Receptor

	Assessment Case		
	Baseline	**Application**	**Cumulative**
Respiratory irritants	6.2E-01	6.2E-01	8.1E-01

Table 4-11: Revised Acute Chemical Mixture Risk Quotients for the Lamont Receptor

	Assessment Case		
	Baseline	**Application**	**Cumulative**
Respiratory irritants	6.1E-01	6.1E-01	7.2E-01

All acute respiratory irritant RQ values were less than one. This mixture contains the following components:

- Acetaldehyde;
- Acrolein;
- Hydrogen sulphide;
- Nitrogen dioxide; and
- Sulphur dioxide.

The changes in the H_2S, NO_2 and SO_2 concentrations as a result of the re-modelling and the use of discrete receptor locations instead of maximum GLACs (as provided in the original EIA) result in a decrease of the respiratory irritant mixture RQ values.

Chronic Mixtures Assessment

Revised chronic mixture RQ values are provided in Tables 4-12- to 4-14.

Table 4-12: Revised Chronic Chemical Mixture Risk Quotients for the Residential Receptor

	Assessment Case		
	Baseline	**Application**	**Cumulative**
Nasal irritants	**1.6E+00**	**1.7E+00**	**1.9E+00**
Respiratory irritants	6.5E-01	6.5E-01	8.2E-01

Table 4-13: Revised Chronic Chemical Mixture Risk Quotients for the Bruderheim Receptor

	Assessment Case		
	Baseline	**Application**	**Cumulative**
Nasal irritants	**2.3E+00**	**2.4E+00**	**3.0E+00**
Respiratory irritants	8.1E-01	8.1E-01	9.9E-01

Table 4-14: Revised Chronic Chemical Mixture Risk Quotients for the Lamont Receptor

	Assessment Case		
	Baseline	**Application**	**Cumulative**
Nasal irritants	**2.4E+00**	**2.5E+00**	**2.7E+00**
Respiratory irritants	8.0E-01	8.0E-01	9.1E-01

The RQ values for the nasal irritants mixture were greater than 1.0 in the baseline, application and cumulative cases for all three receptor locations. Components of the nasal irritant mixture include:

- acrolein; and
- hydrogen sulphide.

The primary determinant of the chronic nasal irritant risk is acrolein. The H_2S concentrations will not contribute appreciably to the overall chronic irritant risks. As discussed in the previous HHRA update (Attachment 2), there is considerable conservatism incorporated into the chronic acrolein exposure limit. For the residential location, and the Bruderheim and Lamont locations, there are only slight increases between the baseline case and the application and cumulative cases, suggesting the baseline sources of the irritants contribute the most risk. For the reasons stated in the chronic acrolein risk discussion (see Attachment 2, Section 3.2.1), the RQ values for the nasal irritants are expected to overstate the actual health risks.

Summary

Revised air quality modeling was completed for CO, SO_2, NO_2, $PM_{2.5}$, and H_2S such that the emissions sources (industrial and community) included in the modeling were consistent with the non-CAC modeling completed in August 2008. In addition, the air concentrations for these five substances were modeled for three discrete receptor locations, as well as at a maximum GLAC location.

The revised air concentrations for these substances did not result in any new exceedances or increases in RQ values. Decreases in the respiratory irritant RQ values for the acute and

chronic respiratory mixtures were evident as a result of the use of receptor-specific air concentrations. The only change to the conclusions of either the original or updated (August 2008) HHRAs is the lack of RQ values greater than 1 for the acute respiratory irritants mixture.

5. *Supplemental Information Request #2, Attachment 2, Section 2, Page 2-3*
AST describes the assessment cases that were evaluated in the HHRA.

   a) Describe how community sources were accounted for in the HHRA.

   A. The following community sources were included in the predictions of the ground level air concentrations: Edmonton, Fort Saskatchewan, Bruderheim, Lamont, Redwater, Bon Accord, Gibbons and Elk Island Park. Community emission sources included traffic from local roadways and highways, and heating units used in residential and commercial buildings. These sources were represented as area sources on a 4 km by 4 km grid.

   The traffic sources were assumed to have a diurnal variation, while the residential and commercial heating sources were assumed to have only a seasonal variation. This temporal variation is in contrast to the industrial sources that are assumed to operate on a continuous basis.

6. *Supplemental Information Request #2, Attachment 2, Section 2.2, Page 2-9*
AST states Level I fugacity modeling for VOCs such as benzene, toluene, ethylbenzene and xylene indicates that 99% of these compounds will partition to air (Mackay et al. 1992). Acrolein and acetaldehyde are also Volatile Organic Compounds and were eliminated as Chemicals of Potential Concern.

   a) Discuss acrolein and acetaldehyde in relation to Level I fugacity modeling and environmental partitioning.

   A. Acrolein and acetaldehyde were not eliminated as chemicals of potential concern for the HHRA. They were not, however, assessed through multiple routes of exposure. Instead, these compounds were evaluated for the inhalation pathway only.

   The argument presented above that VOCs are likely to partition to air was intended to apply to both substances. However, for clarification purposes, additional information is provided in this response.

   Under the Canadian Environmental Protection Act, the Priority Substances assessment of acetaldehyde summarizes the compound's environmental fate characteristics (Health Canada and Environment Canada 2000a). As part of this assessment, fugacity modeling had been conducted using a non-equilibrium steady-state that assumed continuous emissions of acetaldehyde (Level III fugacity modeling). The results of the modeling revealed that, when acetaldehyde is release to air, the mass is distributed according to the following proportions: 97.1% in air, 2.6% in water, 0.3% in soil and 0% in sediment. As such, acetaldehyde emissions from the Project and other regional airborne sources are likely to remain in air with a negligible proportion being transported to another environmental media. In addition, based upon its physical chemical characteristics, acetaldehyde is not expected to adsorb to soil, or

bioaccumulate or biomagnify in the environment (Health Canada and Environment Canada 2000a).

A similar review for acrolein (Health Canada and Environment Canada 2000b) is available. As part of the acrolein assessment, a Level III fugacity model was run assuming a continuous emission of acrolein in a steady-state, non-equilibrium model. It was determined that acrolein will generally remain in the medium in which it was discharged. Acrolein discharged by air is likely to remain in air, with minimal partitioning between environmental media (Health Canada and Environment Canada 2000b). This is further substantiated by statements within ATSDR (2007) noting that the transport of acrolein in the atmosphere is likely limited, and that the relatively high vapour pressure of acrolein indicates that it will not partition from vapour-phase to particulates. Also, environmental fate studies have found that uptake of acrolein by terrestrial plants is poor and the potential for bioaccumulation in organisms is low (Health Canada and Environment Canada 2000b).

7. *Supplemental Information Request #2, Attachment 2, Section 2.3.2, Page 2-10*
AST states Persons that reside at, or visit, these locations will include members of the general population.

a) Provide evidence that no aboriginals will reside or visit locations in the area.

A. The focus of the HHRA was on those communities and individuals potentially affected by the Project. The nearest aboriginal community, Alexander First Nation (AFN), is located more than 50 km west of the Project. Considering that the winds are predominantly from the northwest and that there are no aboriginal communities in the vicinity of the AST Project, the potential for exposure to the Project emissions are anticipated to be minimal for the aboriginal communities. It is the opinion of HAZCO that none of the area's Aboriginal groups will be directly affected by the Project.

While it is possible that visitors to the area may come in contact with the Project emissions, an acute inhalation assessment has been completed at four different locations, one of which represents the maximum ground level air concentration. Regardless of whether a person may be aboriginal or non-aboriginal, the predicted acute inhalation exposures and associated RQs presented in the HHRA are relevant to overall risks to the public.

The HHRA evaluated the potential for adverse health effects to occur to individuals who reside or work in the area over the long-term via the chronic inhalation assessment and chronic multiple-pathway assessment. Given the area's rural land use and in order to conservatively predict potential exposures, it was assumed that people only consume local agricultural foods over a lifetime.

The rural residents (agricultural receptors) are generally expected to have higher overall exposures than those for the aboriginal communities as a result of the consumption rates used.

Table 7-1: Comparison of ingestion rates for agricultural residents assessed in the HHRA to First Nation Traditional Land Users.

Parameter	Consumption rates (g/day)	
	Agricultural resident (HHRA receptor)[1]	Traditional Land User[1]
Root vegetables	188	3
Fruit	46	23
Local beef	90	58

Note:
[1]Consumption rates taken from Health Canada (1994 and 2004) and adopted from Alberta Health and Wellness.

As shown, ingestion rates for the agricultural residents are greater than those that would have been used to assess the potential health impacts to First Nation members engaged in traditional use of the area.

The First Nations ingestion rates discussed in Table 7-1 were adopted from two Alberta Health and Wellness studies that considered dietary intake rates for health risk assessments of First Nations communities in northern Alberta:

- Alberta Health 1997. Swan Hills Special Waste Treatment Centre Human Health Impact Assessment. Health Surveillance, Alberta Health. October 1997; and
- Alberta Health and Wellness. 2007. Assessment of the Potential Lifetime Cancer Risks Associated with Exposure to Inorganic Arsenic among Indigenous People Living in the Wood Buffalo Region of Alberta. March 2007.

Agricultural residents were assumed to consume all their dietary items from the immediate area, while First Nation members would be expected to collect only a fraction of their diets from the Project area. Because persons engaged in traditional land use activities near the Project are assumed to experience lower exposure levels than the area's agricultural residents, aboriginal communities are expected to be presented with lower health risks than those described in the HHRA (i.e., for persons residing in the area).

8. *Supplemental Information Request #2, Attachment 2, Section 2.3.2, Pages 2-14 to 2-15. In Table 2.4.3, AST provides a summary of chemical mixtures.*

   a) Provide an assessment of the chronic respiratory irritants mixture that includes acrolein.

   A. The assessments of the chemical mixtures in the original HHRA and the HHRA update were based on the assumption that the effects of chemicals with exposure limits based on common toxicological endpoints were additive. This is consistent with current Health Canada guidance relating to chemical mixtures (Health Canada 2004). The acute and chronic exposure limits for the chemicals of potential concern (COPCs) were examined, and based on their limits the COPCs were assigned to the mixtures in Table 8-1.

Table 8-1: Summary of Revised Chemical Mixtures

	Potential Health Effect of Mixture	Toxicant Designation	Mixture Components
Acute Inhalation	Irritation	Eye Irritants	Acetaldehyde, acrolein, formaldehyde
		Respiratory Irritants	Acetaldehyde, acrolein*, hydrogen sulphide, nitrogen dioxide, sulphur dioxide
Chronic Inhalation	Irritation	Nasal Irritants	Acrolein, hydrogen sulphide
		Respiratory Irritants	Nitrogen dioxide, sulphur dioxide
	Cancer	Nasal tumours	Acetaldehyde, formaldehyde

Note:
* Although the exposure limit for acrolein was based on eye irritation, Alberta Health and Wellness has required that acrolein also be included in the respiratory irritants group in the past. Thus acrolein was assessed on an acute basis using two different exposure limits, with one based on eye irritation (0.29 µg/m^3) and the other based on respiratory irritation (6.9 µg/m^3).

Although the acute exposure limit for acrolein was based on eye irritation, as described in the footnote to Table 8-1 (and in Appendix A to the HHRA update), a different acute exposure limit was identified and used to evaluate acrolein as part of the acute respiratory irritants mixture. As this second exposure limit was based on respiratory irritation, it was possible to add the acute RQ for acrolein (associated with the second exposure limit) to the respiratory irritant mixture.

Acrolein was not included in the chronic respiratory irritants group as the chronic exposure limit for this COPC is based on the incidence of nasal lesions in rodents. In fact, all of the available chronic exposure limits for acrolein are based on the same endpoint (nasal lesions in rodents). Appendix A to the HHRA update summarized the available chronic exposure limits and their respective toxicological basis. The summary table of limits is presented as Table 8-2 below, with a column added describing the toxicological basis of the limit.

Table 8-2: Chronic Inhalation Exposure Limits for Acrolein

Regulatory Agency	Value (ug/m3)	Type	Toxicological Basis of Limit	Reference
ATSDR	--	--		ATSDR (2006)
Health Canada	0.4	TC	non-neoplastic lesions in the nasal respiratory epithelium of rats	Health Canada (2004)
OEHHA	0.06	REL	histological lesions in the upper airways of rats	OEHHA (2005)
RIVM	--	--		RIVM (2001)
U.S. EPA	0.02	RfC	histological lesions in the nasal cavity of rats	U.S. EPA (2008)
WHO	--	--		WHO (2000)
Note: -- not available.				

As none of the exposure limits are based on chronic lower respiratory irritation, it was not possible to include acrolein in the chronic respiratory irritants group.

9. *Supplemental Information Request #2, Section 3.1, Pages 3-17 to 3-19.*
AST provide the Project Risk Quotients (RQ) for acute inhalation exposures.

a) For RQs greater than one, provide the frequency of exceedances.

A. The only risk quotients greater than 1.0 were associated with hourly acrolein concentrations in excess of the 0.29 µg/m^3 exposure limit. The potential frequencies of exceedances are discussed for each receptor location below.

At the residence, Bruderheim and Lamont locations, 95% of the hourly acrolein concentrations were predicted to be less than the exposure limit. For the maximum ground level air concentration (GLAC), 90% of the hourly acrolein concentrations were predicted to be less than the exposure limit. The number of hours in a year that acrolein concentrations are predicted to exceed the exposure limit was determined for each location (Table 9-1) based upon the worst-case meteorological data for a given year[1].

[1] Four different years of time-series data was evaluated, and the most conservative estimate of exceedances was selected for each receptor location.

Table 9-1: Number of Hours Acute Acrolein Exposure Limit is Expected to be Exceeded

Location	Baseline Case	Application Case	Cumulative Effects Assessment Case	Project Only Case
Residence	67	67	68	0
Bruderheim	153	157	171	0
Lamont	217	223	227	0
Maximum GLAC	205	519	525	297

10. *Supplemental Information Request #2, Attachment 2, Appendices B1 and B2.*

a) Provide information on the model and parameters used to calculate the predicted ground-level air concentrations.

b) Provide a worked example for the multi-media HHRA (include the calculations for both human and game tissue concentrations).

c) Outline what environmental media used in the multi-media assessment were modeled versus predicted.

A. The air quality model and the input parameters used to predict the ground level air concentrations for the Human Health Risk Assessment Update was described in Volume IIA, Appendix I (Dispersion Modelling Approach) of the June 2007 EIA (i.e., AST Application for Approval of the Bruderheim Sulphur Forming and Shipping Facility).

B. Model Description and Worked Example

Introduction

This appendix provides technical information related to the quantitative assessment of chronic exposure and the potential risks to humans from chemicals associated with the proposed AST Bruderheim Sulphur Processing Facility (the Project).

Exposures to chemicals of potential concern (COPCs) were estimated at specified receptor locations, based on the following factors:

- specific physical, chemical and biological factors that determine the rate and amount of uptake of chemicals into the body;
- physical and chemical characteristics which determine the interaction and behaviour of a chemical with its surrounding environment (e.g., water solubility, volatility, tendency to bind to particles);
- characteristics of the sites and surrounding areas;

- characteristics of the environmental media at the sites (e.g., air and soil), as well as the concentrations of chemicals entering the environment from various sources, and their persistence in the environment;
- behavioural and lifestyle characteristics of potentially exposed human receptors (e.g., respiration rate, body weight); and
- assumed empirical or theoretical mathematical or statistical relationships between human exposure variables.

A summary of the available data (chemical concentrations) in soil, water, plants and game used to characterize background exposures was included within Appendices B1 and B2 to the updated Human Health Risk Assessment, part of the previous SIR responses package (August 2008, Attachment 2).

In Appendix B2, a formatting error occurred in Table B2-1, resulting in non-representative values. The error has been corrected and Table B2-1 is included in Attachment 1 for consistency.

Risk estimates were determined for the baseline, application and cumulative assessment cases. Incremental cancer risks (not including background risks) were estimated for non-threshold chemicals (i.e., carcinogens) as recommended by Health Canada (2006) for the Project alone.

Polycyclic aromatic hydrocarbons (PAHs) have been measured in the Fort Saskatchewan region but are seldom detected. Volatile organic compounds (VOCs) have typically not been measured in background assessments, as they are highly volatile and are generally not deposited to the terrestrial or aquatic environments. Potential exposures to PAHs were estimated from models that predicted uptake to environmental media (i.e., soil, water, plants and game).

Assumptions and Methodology

In order to quantify potential human exposures (and associated health impacts) as a result of emissions from the Project, predicted chemical concentrations in various environmental media were required to estimate exposures and characterize risks. An inhalation assessment was conducted on both an acute and chronic basis for the identified COPCs. In addition, chemical concentrations in the following media were estimated based on air concentrations:

- soil;
- soil pore water;
- indoor air and dusts; and
- local agricultural foods (beef, dairy, poultry, eggs).

Many of the equations and assumptions used to predict environmental media concentrations were provided by the U.S. EPA OSW (2005). In addition to providing the equations and

algorithms used to estimate environmental media concentrations, the following sections provide the methods used to estimate human chemical exposures, and to predict risks.

Maximum annual average ground level air concentrations were predicted at several human receptor locations identified in the Problem Formulation of the main report.

The assessment of inhalation exposures alone (acute and chronic) involved the use of the predicted air concentrations for each receptor group. The maximum predicted air concentrations out of all receptor locations (except the maximum ground level air concentration (GLAC), as it is not feasible that people or livestock would be exposed to the maximum GLAC over a long duration of time) were used to predict the concentrations of COPCs in foods.

A worked example is provided for an adult receptor for exposure to benzo(a)pyrene (whole mixture model) in the application case.

Predicted Soil Concentrations

Predicted chemical concentrations in soil were based on predicted maximum annual average ground level air concentrations. Soil concentrations were estimated by applying deposition rates to air quality modeling results, and then calculating soil concentrations based on equations described below. Predicted soil concentrations were presented in Appendix B of the HHRA update issued in August 2008.

Background Deposition

Atmospheric deposition of organic and inorganic chemicals occurs in two modes: wet and dry deposition (Golomb et al. 1997). In wet deposition, aerosols and gases are dissolved or suspended in precipitation: rain, snow, hail, fog and mist. Dry deposition of particles occurs by direct impaction and gravitational settling on land or water surfaces.

Calculating the Wet Vapour Deposition Velocity:

$$V_{wvd} = P_a \times SR \times CF$$

Where:

Vwvd = velocity of wet vapour deposition [m/s]

Pa = annual precipitation rate [m/year]

SR = scavenging ratio [200,000 unitless]

CF = conversion factor from years to seconds [3.1709979E-08 year/s]

The scavenging ratio represents the ratio between the volume of air a typical raindrop will sweep through as it falls to the earth relative to the volume of the rain drop. Therefore, a typical raindrop will fall through a volume equal to 200,000 (Mackay 1991) times its volume prior to landing on land or water. Canadian climate “normals” recorded at Fort Saskatchewan,

Alberta between 1971 and 2000 provides a precipitation rate of 459.5 mm/year (Environment Canada 2007). Using this value the wet deposition velocity is estimated to be 0.003 m/s. The human health risk assessment assumed a wet deposition velocity of 0.004 m/s which is conservative and consistent with previous assessments. The dry deposition velocity was assumed to be 0.01 m/s (extrapolated from Wesley and Hicks 2000).

Converting the Air Concentration to a Deposition Rate

Deposition rates were predicted by combining the predicted ground-level air concentration with the wet and dry vapour and particulate deposition velocity, calculated as follows:

$$D = \left(C_{air} \times (1 - Fv) \times V \times CF\right) + \left(C_{air} \times Fv \times V \times CF\right)$$

Where:

D = vapour or particulate deposition rate (mg/m^2/yr)

C_{air} = concentration in air (mg/m^3)

Fv = vapour phase fraction (%)

V = wet or dry deposition velocity (m/s)

CF = conversion from seconds to years (31,536,000 s/y)

Dry Vapour and Particulate Deposition Rate

$$Dd = \left(C_{air} \times (1 - Fv) \times V \times CF\right) + \left(C_{air} \times Fv \times V \times CF\right)$$
$$Dd = \left(1.77E-08 \times (1 - 0.29) \times 0.015 \times 31536000\right) + \left(1.77E-08 \times 0.29 \times 0.015 \times 31536000\right)$$
$$Dd = 8.4E-03\ mg/m^2/yr$$

Wet vapour and particulate deposition rate:

$$Dw = \left(C_{air} \times (1 - Fv) \times V \times CF\right) + \left(C_{air} \times Fv \times V \times CF\right)$$
$$Dw = \left(1.77E-08 \times (1 - 0.29) \times 0.004 \times 31536000\right) + \left(1.77E-08 \times 0.29 \times 0.004 \times 31536000\right)$$
$$Dw = 2.2E-03\ mg/m^2/yr$$

Total Deposition Rate: 8.4E-03 + 2.2E-03 = 1.1E-02 mg/m^2/yr

Calculating the Deposition Term

Deposition to soil was calculated using the following equation:

$$D_s = \frac{D}{Z_s \times BD}$$

Where:

Ds = chemical specific deposition (mg/kg/yr)

D = chemical-specific dry and wet vapour and particulate deposition rate ($mg/m^2/yr$)

Z_s = soil mixing zone depth (m)

BD = soil bulk density (kg/m^3)

The bulk density was assumed to be 1,500 kg/m^3, and soil concentrations were predicted for two mixing depths (i.e., 2 cm and 20 cm).

$$D_s = \frac{D}{Z_s \times BD}$$

$$D_s = \frac{1.1E-02}{0.2 \times 1500}$$

$$D_s = 3.5E-05\ mg/kg/yr$$

Calculating Chemical Loss Constants

For PAHs, abiotic and biotic degradation and volatilization processes were considered. The soil half-life values for abiotic and biotic degradation were obtained from literature. Whereas, chemical loss from volatilization was predicted as follows:

$$t_{1/2} = 1.58 \times 10^{-8} \times \left(\frac{K_{oc} \times S}{VP} \right)$$

Where:

$t_{1/2}$ = soil half-life (days)

Koc = organic carbon partition coefficient (L/kg)

S = water solubility (mg/L)

VP = vapour pressure (mmHg)

The half-life is then converted to a rate constant (yr^{-1}) using the following equation:

$$kv = \frac{0.693}{(t_{1/2}/365\ days)}$$

Soil half-life:

$$t_{1/2} = 1.58 \times 10^{-8} \times \left(\frac{K_{oc} \times S}{VP} \right)$$

$$t_{1/2} = 1.58 \times 10^{-8} \times \left(\frac{9.7E+05 \times 1.6E-03}{5.5E-09} \right)$$

$$t_{1/2} = 4.5E+03 \ \ days$$

Loss due to volatilization:

$$kv = \frac{0.693}{(t_{1/2}/365 \ days)}$$

$$kv = \frac{0.693}{(4.5E+03/365 \ days)}$$

$$kv = 5.6E-02 \ yr^{-1}$$

The total soil loss constant was then calculated as follows:

$$kt = ks + kv$$

Where:

kt = chemical-specific soil loss constant due to all processes (yr-1)

ks = chemical-specific soil loss constant due to abiotic and biotic degradation (yr-1)

kv = chemical-specific soil loss constant due to volatilization (yr-1

$$kt = ks + kv$$

$$kt = 0.48 + 5.6E-02$$

$$kt = 5.4E-01 \ yr^{-1}$$

Calculating the Soil Concentration

Soil concentrations were calculated on a mass per mass basis (mg/kg) using the following equation:

$$Cs = \left[\frac{D_s \times [1 - \exp(-kt \times tD)]}{kt} \right]$$

Where:

Cs = measured and predicted soil concentration from deposition over time (mg/kg)

Ds = deposition term (mg/kg/yr)

kt = chemical soil loss constant due to all processes (yr-1)

tD = period over which deposition occurs (75 years)

$$Cs = Cs_{meas} + \left[\frac{D_s \times \left[1 - \exp(-kt \times tD)\right]}{kt}\right]$$

$$Cs = \left[\frac{3.5E-05 \times \left[1 - \exp(-5.4E-01 \times 75)\right]}{5.4E-01}\right]$$

$$Cs = 6.6E-05 \ \ mg/kg$$

Chemical Concentrations in Dust

The chemical concentration in dust was calculated using the measured or predicted soil concentration, as follows:

$$C_{dust} = DL \times Cs \times CF$$

Where:

C_{dust} = chemical concentration in dust (µg/m3)

DL = dust level (kg/m3)

Cs = surface soil concentration from deposition over time (mg/kg)

CF = conversion factor from mg to µg

A dust level of 0.76 µg/m^3 was measured by Health Canada (2004) based on the average airborne concentration of respirable particulate matter (<10 µm aerodynamic diameter).

$$C_{dust} = DL \times Cs \times CF$$

$$C_{dust} = 7.6E-10 \times 6.6E-04 \times 1000$$

$$C_{dust} = 5.0E-10 \ \ \mu g/m^3$$

Chemical Concentrations in Vegetation

The following mechanisms were included when estimating the uptake of the chemicals into the tissue of plants, as described in detail following:

- direct deposition of particles;
- air to above-ground produce (vapour transfer to leaves or foliage);

- soil to above-ground produce; and
- soil to below-ground produce.

Aboveground Leafy Plant Concentration Due to Direct Deposition

Atmospheric deposition was only considered for plants whose edible portions are aboveground and where the chemical potentially exists in particulate form. The following equations were used to predict browse concentrations due to direct wet and dry deposition processes on a dry weight (DW) basis.

For chemicals for which a deposition rate was provided:

$$Pd = \frac{D \times Rp \times \left[1.0 - \exp\left(-kp \times Tp\right)\right]}{Yp \times kp}$$

For chemicals for which the deposition rate was predicted:

$$Pd = \frac{\left[Dd + \left(Fw \times Dw\right)\right] \times Rp \times \left[1.0 - \exp\left(-kp \times Tp\right)\right]}{Yp \times kp}$$

Where:

Pd = browse concentration due to direct deposition (mg/kg DW)

D = deposition rate (mg/m2/y)

Dd = annual average dry deposition from particle phase (mg/m2/yr)

Dw = annual average wet deposition from particle phase (mg/m2/yr)

Fw = fraction of wet deposition that adheres to plant (0.6; unitless)

Rp = intercept fraction of edible portions of plant (0.5; unitless)

kp = plant surface loss coefficient (18 yr-1)

Tp = length of plant exposure to deposition per harvest of the edible portion of the i^{th} plant group (0.12 yr)

Yp = crop yield or productivity (0.24 kg DW/m^2)

The same equation was used to predict produce concentrations due to direct deposition; however, adjustments were made for apportionment and washing and peeling. In addition, the produce concentration was calculated on a wet weight (WW) basis.

$$Pd = \left(\frac{[Dd + (Fw \times Dw)] \times Rp \times [1.0 - \exp(-kp \times Tp)]}{Yp \times kp} \right) \times AF \times WPF \times (1 - WC)$$

Where:

Pd	=	produce concentration due to direct deposition (mg/kg WW)
D	=	deposition rate (mg/m2/y)
Dd	=	annual average dry deposition from particle phase (mg/m2/y)
Dw	=	annual average wet deposition from particle phase (mg/m2/y)
Fw	=	fraction of wet deposition that adheres to plant (0.6; unitless)
Rp	=	intercept fraction of edible portions of plant (0.39; unitless)
kp	=	plant surface loss coefficient (18 yr-1)
Tp	=	length of plant exposure to deposition per harvest of the edible portion of the i^{th} plant group (0.16; yr)
Yp	=	crop yield or productivity (2.24; kg DW/m2)
AF	=	chemical-specific apportionment factor (%)
WPF	=	washing and peeling factor (0.85; unitless)
WC	=	water or moisture content of produce (59%)

Concentration in forage/browse due to direct deposition

Annual average dry particulate deposition rate:

$$Ddp = C_{air} \times (1 - Fv) \times Vd \times CF$$
$$Ddp = 1.77E-08 \times (1 - 0.29) \times 0.01 \times 31536000)$$
$$Ddp = 5.9E-03\ mg/m^2/yr$$

Annual average wet particulate deposition rate:

$$Dwp = C_{air} \times (1 - Fv) \times Vw \times CF$$
$$Dwp = 1.77E-08 \times (1 - 0.29) \times 0.004 \times 31536000)$$
$$Dwp = 1.5E-03\ mg/m^2/yr$$

Browse concentration due to direct deposition:

$$Pd = \frac{[Dd + (Fw \times Dw)] \times Rp \times [1.0 - \exp(-kp \times Tp)]}{Yp \times kp}$$

$$Pd = \frac{[5.9E-03 + (0.6 \times 1.5E-03)] \times 0.5 \times [1.0 - \exp(-18 \times 0.12)]}{0.24 \times 18}$$

$$Pd = 7.0E-04\, mg/kg\ DW$$

Concentration in aboveground produce due to direct deposition

Annual average dry particulate deposition rate:

$$Ddp = C_{air} \times (1 - Fv) \times Vd \times CF$$

$$Ddp = 1.77E-08 \times (1 - 0.29) \times 0.01 \times 31536000)$$

$$Ddp = 5.9E-03\, mg/m^2/yr$$

Annual average wet particulate deposition rate:

$$Dwp = C_{air} \times (1 - Fv) \times Vw \times CF$$

$$Dwp = 1.77E-08 \times (1 - 0.29) \times 0.004 \times 31536000)$$

$$Dwp = 1.5E-03\, mg/m^2/yr$$

Produce concentration due to direct deposition:

$$Pd = \left(\frac{[Dd + (Fw \times Dw)] \times Rp \times [1.0 - \exp(-kp \times Tp)]}{Yp \times kp} \right) \times AF \times WPF \times (1 - WC)$$

$$Pd = \left(\frac{[5.9E-03 + (0.6 \times 1.5E-03)] \times 0.39 \times [1.0 - \exp(-18 \times 0.16)]}{2.24 \times 18} \right) \times 1.0 \times 0.85 \times (1 - 0.59)$$

$$Pd = 2.1E-05\, mg/kg\ WW$$

Aboveground Leafy Plant Concentration Due to Vapour Uptake

The concentration of chemicals in aboveground plants from direct uptake of vapour phase chemicals on plant surfaces was calculated using a mass-based air-to-plant biotransfer factor, which was derived from the volumetric air-to-plant biotransfer factor. The volumetric air-to-plant biotransfer factor was calculated as follows:

$$\log B_{vol} = 1.065 \times \log K_{ow} - \log\left(\frac{H}{R \times T}\right) - 1.654$$

Where:

B_{vol} = volumetric air-to-plant biotransfer factor (unitless; WW basis)

log K_{ow} = log of the octanol-water partition coefficient (unitless)

H = Henry's Law constant of the compound (atm m3/mol)

T = room temperature in Kelvin (288 K)

R = gas constant (0.000082 atm m3/K mol)

Volumetric air-to-plant biotransfer factor

$$\log B_{vol} = 1.065 \times \log K_{ow} - \log\left(\frac{H}{R \times T}\right) - 1.654$$

$$\log B_{vol} = 1.065 \times \log(1.0E + 06) - \log\left(\frac{1.1E - 06}{0.000082 \times 288}\right) - 1.654$$

$$B_{vol} = 1.2E + 09$$

The mass-based air-to-plant biotransfer factor is calculated with the following equation:

$$B_v = \frac{\rho_{air} \times B_{vol}}{(1 - WC) \times \rho_{forage}}$$

Where:

B_v = mass-based air-to-plant biotransfer factor ([µg/g DW plant]/[µg/g air])

ρair = density of air (1.19 g/L; Weast 1981)

Bvol = volumetric air-to-plant biotransfer factor (unitless; WW basis)

WC = water or moisture content of plant (%, 0.6 assumed

ρforage = density of forage (770 g/L; McCrady and Maggard 1993)

Mass-based air-to-plant biotransfer factor for prediction of animal exposure and tissue concentrations

$$B_v = \frac{\rho_{air} \times B_{vol}}{(1-WC) \times \rho_{forage}}$$

$$B_v = \frac{1.19 \times 1.2E+09}{(1-0.85) \times 770}$$

$$B_v = 1.2E+07 \ [\mu g / g \ DW \ \ plant] / [\mu g / g \ air]$$

Mass-based air-to-plant biotransfer factor for prediction of human exposure

$$B_v = \frac{\rho_{air} \times B_{vol}}{(1-WC) \times \rho_{forage}}$$

$$B_v = \frac{1.19 \times 1.2E+09}{(1-0.59) \times 770}$$

$$B_v = 4.5E+06 \ [\mu g / g \ DW \ \ plant] / [\mu g / g \ air]$$

The following equation was used to calculate aboveground plant tissue concentrations due to vapour uptake for forage/browse:

$$P_v = \frac{C_{air} \times (B_v / RF) \times F_v}{\rho_{air}}$$

Where:

Pv = COPC concentration in plant (mg/kg DW)

Cair = COPC concentration in air (µg/m3)

Bv = mass-based air-to-plant biotransfer factor ([µg/g dry-weight plant]/[µg/g air])

RF = reduction factor (unitless, PAHs = 100)

Fv = fraction of the chemical in vapour phase (%)

ρair = density of air (1200 g/m3; Weast 1981)

The following equation was used to calculate aboveground plant tissue concentrations due to vapour uptake for produce:

$$P_v = \left[\frac{C_{air} \times (B_v / RF) \times F_v \times VG_{ag}}{\rho_{air}} \right] \times AF \times WPF \times (1-WC)$$

Where:

P_v = COPC concentration in plant (mg/kg WW)

Cair = COPC concentration in air (µg/m3)

Bv = mass-based air-to-plant biotransfer factor (µg/g dry-weight plant/µg/g air)

RF = reduction factor (PAHs = 100)

Fv = fraction of the chemical in vapour phase (unitless)

VGag = empirical correction factor for aboveground produce (unitless)

ρair = density of air (1200 g/m3; Weast 1981)

AF = chemical-specific apportionment factor (%)

WPF = washing and peeling factor (0.85; unitless)

WC = water or moisture content of plant (59%)

Concentration in forage/browse due to vapour uptake for prediction of livestock exposure and tissue concentrations

$$P_v = \frac{C_{air} \times (B_v / RF) \times F_v}{\rho_{air}}$$

$$P_v = \frac{1.77E-05 \times (1.2E+07/100) \times 0.29}{1200}$$

$$P_v = 5.2E-04 \ mg/kg \ DW$$

Concentration in aboveground produce due to vapour uptake for prediction of human exposure

$$P_v = \left[\frac{C_{air} \times (B_v / RF) \times F_v \times VG_{ag}}{\rho_{air}} \right] \times AF \times WPF \times (1 - WC)$$

$$P_v = \left[\frac{1.77E-05 \times (4.5E+06E/100) \times 0.29 \times 0.01}{1200} \right] \times 1.0 \times 0.85 \times (1 - 0.59)$$

$$P_v = 6.7E-07 \ mg/kg \ WW$$

Aboveground Leafy Plant Concentration Due to Root Uptake

The U.S. EPA OSW (2005) provides an equation to predict aboveground plant concentrations due to root uptake using soil concentrations and plant-to-soil bioconcentration factors (BCFs) for aboveground produce and forage/browse.

Plant-to-soil BCFs for forage/browse and produce were calculated based on the following equation recommended by the U.S. EPA OSW (2005), adopted from Travis and Arms (1988):

$$\log BCF = 1.588 - 0.578 \times \log K_{ow}$$

Where:

BCF = plant-soil bioconcentration factor for aboveground produce (kg-soil/kg-plant DW)

log K_{ow} = log of the octanol-water partition coefficient (unitless)

The above equation was derived from experiments conducted on compounds with log K_{ow} values ranging from 1.15 to 9.35. Thus, BCF values for compounds with a log K_{ow} value less than 1.15 should be calculated using a log K_{ow} value of 1.15 and BCF values for compounds with a log K_{ow} greater than 9.35 should be calculated using a log K_{ow} value of 9.35 (U.S. EPA OSW 2005).

Plant-to-soil bioconcentration factor

$$\log BCF = 1.588 - 0.578 \times \log K_{ow}$$
$$\log BCF = 1.588 - 0.578 \times \log(1.0E + 06)$$
$$BCF = 1.3E - 02 kg \cdot soil / kg \cdot plant\ DW$$

The following equation was used to predict the chemical concentration in aboveground forage/browse due to root uptake (U.S. EPA OSW 2005).

$$\mathrm{Pr} = Cs \times BCF$$

Where:

Pr = chemical concentration in aboveground plant due to root uptake (mg/kg DW)

Cs = chemical concentration in soil (mg/kg)

BCF = plant-soil bioconcentration factor for aboveground produce (kg-soil/kg-plant DW)

The same equation was used to calculate the chemical concentration in aboveground produce, with adjustments made for apportionment, washing and peeling and the moisture content of the plant.

$$\mathrm{Pr} = Cs \times BCF \times AF \times WPF \times (1 - WC)$$

Where:

Pr	=	chemical concentration in aboveground plant due to root uptake (mg/kg WW)
Cs	=	chemical concentration in soil (mg/kg)
BCF	=	plant-soil bioconcentration factor for aboveground produce (kg-soil/kg-plant DW)
AF	=	chemical-specific apportionment factor (%)
WPF	=	washing and peeling factor (0.85; unitless)
WC	=	water or moisture content of plant (59%))

Concentration in forage/browse due to root uptake for the prediction of livestock exposure and tissue concentrations

$$\mathrm{Pr} = Cs \times BCF$$
$$\mathrm{Pr} = 6.6E-05 \times 1.3E-02$$
$$\mathrm{Pr} = 8.6E-07\ mg/kg\ DW$$

Concentration in aboveground ***produce due to root uptake for the prediction of human exposure***

$$\mathrm{Pr} = Cs \times BCF \times AF \times WPF \times (1 - WC)$$
$$\mathrm{Pr} = 6.6E-05 \times 1.3E-02 \times 1.0 \times 0.85 \times (1 - 0.59)$$
$$\mathrm{Pr} = 3.0E-07\ mg/kg\ WW$$

Belowground Plant Concentration Due to Root Uptake

Belowground produce refers to all root-vegetables and therefore concentrations derived using this methodology only applied to root-vegetable consumption rates. Given that livestock were not assumed to consume root vegetables or cattail, a belowground forage/browse concentration was not required.

The belowground produce concentration for root vegetables was calculated as follows:

$$\mathrm{Pr}_{root} = Cs \times BCF \times AF \times WPF \times (1 - WC)$$

Where:

Pr_{root}	=	chemical concentration in belowground produce (root vegetables) due to root uptake (mg/kg WW)
Cs	=	chemical concentration in soil (mg/kg)

BCF = plant-to-soil bioconcentration factor for belowground plants (kg-soil/kg-plant DW, U.S. EPA OSW 2005)

AF = chemical-specific apportionment factor (%)

WPF = washing and peeling factor (0.85; unitless)

WC = water or moisture content of root vegetables (85%; U.S. EPA OSW 2005)

Concentration in root vegetables due to root uptake for prediction of human exposure

$$\mathrm{Pr}_{root} = Cs \times BCF \times AF \times WPF \times (1 - WC)$$
$$\mathrm{Pr}_{root} = 6.6E-05 \times (7.9E-03) \times 1 \times 0.85 \times (1 - 0.85)$$
$$\mathrm{Pr}_{root} = 6.6E-08\, mg/kg\ WW$$

Surface Water Concentration

Due to the lack of a reliable data set of detectable values, surface water concentrations as they relate to plants and animals were predicted from airborne deposition to soil and subsequent runoff.

Predicted Surface Water Concentrations

$$C_w = C_s \text{ x } (BD / (Pw + (K_d * BD) + H * P_a))$$

Where,

C_w = concentration in runoff

Cs = concentration in soil

P_w = moisture filled porosity for fine soils (0.168, dimensionless) from AENV 2006

P_a = vapour filled porosity for fine soils (0.32, dimensionless) from AENV 2006

K_d = soil to water partition coefficient from AENV 2006 and CCME 2006

BD = soil bulk density (1500 kg/m3) from AENV 2006

H = unitless Henry's constant

$C_w = C_s$ x (BD / (Pw + (K_d * BD) + H * P_a))

C_w = 6.6E-05 x (1500/ (0.168 + (160000* 1500) + (4.5E-05 * 0.302)

C_w = 4.1E-10

Due to the effect of dilution in the movement of surface water to a surface water body, Cw is assumed to be diluted by a factor of 10.

$$C_{sw} = C_w/DF$$

Where,

C_w = concentration in runoff

DF = dilution factor (10, unitless).

Csw = 4.1E-10/10

Csw = 4.1E-11

Chemical Concentrations in Fruit and Berries

The chemical concentration in fruits and berries was derived using soil concentrations and plant-to-soil bioconcentration factors for aboveground produce.

Plant-to-soil BCFs for berries were calculated based on the following equation recommended by the U.S. EPA OSW (2005), adopted from Travis and Arms (1988):

$$\log BCF = 1.588 - 0.578 \times \log K_{ow}$$

Where:

BCF = plant-soil bioconcentration factor for aboveground produce (kg-soil/kg-plant DW)

$\log K_{ow}$ = log of the octanol-water partition coefficient (unitless)

The above equation was derived from experiments conducted on compounds with log Kow values ranging from 1.15 to 9.35. Thus, BCF values for compounds with a log Kow value less than 1.15 should be calculated using a log Kow value of 1.15 and BCF values for compounds with a log Kow greater than 9.35 should be calculated using a log Kow value of 9.35 (U.S. EPA OSW 2005).

Plant-to-soil bioconcentration factor

$$\log BCF = 1.588 - 0.578 \times \log K_{ow}$$
$$\log BCF = 1.588 - 0.578 \times \log(1.0E + 06)$$
$$BCF = 1.3E - 02 kg \cdot soil / kg \cdot plant\ DW$$

The following equations were used to predict the chemical concentration in fruits and berries (U.S. EPA OSW 2005).

For the prediction of human exposure:

$$Pb = Cs \times BCF \times AF \times WPF \times (1 - WC)$$

Where:

Pb = chemical concentration in fruit and berries (mg/kg WW)

Cs = chemical concentration in soil (mg/kg)

BCF = plant-soil bioconcentration factor for aboveground produce (kg-soil/kg-plant DW)

AF = chemical-specific apportionment factor (%)

WPF = washing and peeling factor (0.85; unitless)

WC = water or moisture content of plant (60%)

Concentration in aboveground produce due to root uptake for the prediction of human exposure

$$\Pr = Cs \times BCF \times AF \times WPF \times (1 - WC)$$
$$\Pr = 6.6E-05 \times 1.3E-02 \times 1.0 \times 0.85 \times (1 - 0.6)$$
$$\Pr = 3.0E-07\ mg/kg\ WW$$

Chemical Concentrations in Invertebrates

The chemical concentration in terrestrial and benthic invertebrates was derived using soil or sediment concentrations and soil- or sediment-to-invertebrate bioconcentration factors. Invertebrate concentrations were only predicted for the calculation of livestock exposure and tissue concentrations.

The soil- or sediment-to-invertebrate bioconcentration factors were taken from literature. In some cases, only the slope and constant values of the regression models used to predict BCFs were provided. Different equations were used to predict invertebrate concentrations based on whether a BCF value or slope and constant values were available.

Chemical Concentration in Terrestrial Invertebrates

The equations used to predict chemical concentrations in terrestrial invertebrates are provided following.

If a BCF value was available:

$$C_{invert} = Cs \times BCF$$

Where:

C_{invert} = chemical concentration in terrestrial invertebrates (mg/kg DW)

Cs = chemical concentration in soil (mg/kg)

BCF = soil-to-soil invertebrate bioconcentration factor (kg-soil/kg-invertebrate DW)

If slope and constant values for a BCF regression model were available:

$$C_{invert} = \exp(a + b \times \ln Cs)$$

Where:

C_{invert} = chemical concentration in terrestrial invertebrates (mg/kg DW)

a = constant for a BCF regression model

b = slope for a BCF regression model

ln Cs = natural logarithm of the chemical concentration in soil (mg/kg)

Concentration in terrestrial invertebrates

$$C_{invert} = Cs \times BCF$$
$$C_{invert} = 6.6E-05 \times 0.419$$
$$C_{invert} = 2.7E-05 \ mg/kg \ DW$$

Livestock and Game Tissue Concentrations

Livestock exposure and tissue concentrations were calculated following the U.S. EPA OSW (2005) methodology. To estimate tissue residue levels, receptors were assumed to be exposed to chemicals through consumption of affected soil and food. The following sections provide the equations used to calculate the total daily dose of a chemical via the individual exposure pathways for livestock and the corresponding tissue concentrations.

Food Ingestion Rates

The rate of food consumption that an animal must achieve to meet its metabolic needs was calculated by dividing the free-living (or field) metabolic rate (FMR) by the metabolizable energy in its food (U.S. EPA 1993; Nagy 1987).

Metabolizable Energy

The metabolizable energy for dietary items can be calculated as follows:

$$ME = AE \times GE$$

Where:

ME = metabolizable energy of dietary item (kcal/kg)

AE = assimilation efficiency of dietary item (%)

GE = gross energy of dietary item (kcal/kg DW)

The assimilation efficiency and gross energy values for the different dietary items were provided by the U.S. EPA (1993). An example calculation is provided for beef.

Metabolizable energy of browse for beef

$$ME = AE \times GE$$
$$ME = 0.76 \times 4200$$
$$ME = 3.2E+03 \ \ kcal/kg$$

Free-Living Metabolic Rate

Nagy (1987) provides allometric equations to estimate free-living metabolic rate (FMR) based on the following formula:

$$FMR = a \times BW^{b}$$

Where:

FMR = free-living metabolic rate (kcal/day)

a = slope of the allometric equation for the FMR (unitless)

BW = body weight (g)

b = y-intercept of the allometric equation for the FMR (unitless)

Nagy et al. (1999) and the U.S. EPA (1993) provide a number of slope and y-intercept values for FMRs specific to orders and trophic levels (e.g., rodentia, galliformes, herbivores). These values were used to estimate the FMR values for each livestock species.

Free-living metabolic rate for beef

$$FMR = a \times BW^{b}$$
$$FMR = 7.94 \times (5.7E+05)^{0.646}$$
$$FMR = 4.1E+04 \, kcal/day$$

To normalize the FMR to body weight, the FMR was divided by the body weight of the livestock species:

$$NFMR = \frac{FMR}{BW}$$

Where:

NFMR = normalized free-living metabolic rate (kcal/kg bw/day)

FMR = free-living metabolic rate (kcal/day)

BW = body weight (kg)

Normalized free-living metabolic rate for beef

$$NFMR = \frac{FMR}{BW}$$

$$NFMR = \frac{4.1E+04}{5.7E+02}$$

$$NFMR = 7.3E+01 \ \ kcal/kg\ bw/day$$

Estimation of Food Ingestion Rate

The estimated ingestion rate for each dietary item was calculated as follows:

$$FIR_i = \frac{FMR \times P_i}{ME_i}$$

Where:

FIRi = food ingestion rate for the 'i' dietary item (kg/day)

FMR = free-living metabolic rate (kcal/day)

P_i = portion of diet consisting of '*i*' dietary item (%)

ME_i = metabolizable energy of '*i*' dietary item (kcal/kg)

Estimated browse ingestion ***rate for beef***

$$FIR_{browse} = \frac{FMR \times P_{browse}}{ME_{browse}}$$

$$FIR_{browse} = \frac{4.1E+04 \times 100\%}{3192}$$

$$FIR_{browse} = 1.3E+01 kg/day$$

The total ingestion rate for all dietary items was estimated by summing the individual ingestion rates for each dietary item:

$$FIR_{total} = FIR_{browse} + FIR_{berry} + FIR_{aq} + FIR_{invert}$$

Where:

FIR_{total} = total food ingestion rate for all dietary items (kg/day)

FIR_{browse} = food ingestion rate of browse (kg/day)

FIR_{berry} = food ingestion rate of berries (kg/day)

FIR_{aq} = food ingestion rate of aquatic plants (kg/day)

FIR_{invert} = food ingestion rate of terrestrial invertebrates (kg/day)

Total food ingestion rate ***for beef***

$$FIR_{total} = FIR_{browse} + FIR_{berry} + FIR_{lichen} + FIR_{aq} + FIR_{fish} + FIR_{prey} + FIR_{invert}$$
$$FIR_{total} = 1.3E+01 + 0 + 0 + 0$$
$$FIR_{total} = 1.3E+01 \ \ kg/day$$

To normalize the total food ingestion rate to body weight, the FIR_{total} was divided by the body weight of the livestock species:

$$NFIR_{total} = \frac{FIR_{total}}{BW}$$

Where:

$NFIR_{total}$ = normalized total food ingestion rate (kg-food/kg-bw day)

FIR_{total} = total food ingestion rate for all dietary items (kg/day)

BW = body weight (kg)

Normalized total food ingestion rate for beef

$$NFIR_{total} = \frac{FIR_{total}}{BW}$$
$$NFIR_{total} = \frac{1.3E+01}{5.3E+02}$$
$$NFIR_{total} = 2.4E-02 \ \ kg \cdot food/kg \cdot bw/day$$

Soil Ingestion Rates

The soil ingestion rates were calculated as a percentage of the total estimated food ingestion rate for all dietary items. The percentage of soil and sediment in the diet for each of the livestock species was obtained from literature.

Soil ingestion rates were calculated as follows:

$$SIR = P_{soil} \times FIR_{total}$$

Where:

SIR = soil ingestion rate (kg/day)

P_{soil} = percent of soil in diet (%)

FIR_{total} = total food ingestion rate for all dietary items (kg/day)

Soil ingestion rate for beef

$$SIR = P_{soil} \times FIR_{total}$$
$$SIR = 0.04 \times 1.3E+01$$
$$SIR = 5.2E-01 \ \ kg/day$$

Water Ingestion Rates

Water ingestion rates for cattle and chickens were obtained from AAFRD (2000).

Air Inhalation Rates

The U.S. EPA (1993) provides allometric equations to predict air inhalation rates for birds and mammals.

Inhalation rates for birds:

$$AIR = 0.4089 \times BW^{0.77}$$

Inhalation rates for mammals:

$$AIR = 0.5458 \times BW^{0.80}$$

Where:

AIR = air inhalation rate (m^3/day)

BW = body weight of animal (kg)

Air inhalation rate for chickens

$$AIR = 0.4089 \times BW^{0.77}$$
$$AIR = 0.4089 \times 2.5^{0.77}$$
$$AIR = 8.3E-01 m^3 / day$$

Air inhalation rate for beef

$$AIR = 0.5458 \times BW^{0.80}$$
$$AIR = 0.5458 \times (560)^{0.80}$$
$$AIR = 5.4E+01 \ m^3 / day$$

Estimated Daily Intakes

The estimated daily intakes for each dietary item were predicted by applying the ingestion rate specific to the dietary item to the predicted chemical concentration in the dietary item. The calculations used to predict the estimated daily intakes associated with each dietary item are provided below.

Soil Ingestion

$$EDI_{soil} = Cs \times SIR$$

Where:

EDI_{soil} = estimated daily intake of chemical in soil (mg/day)

Cs = chemical concentration in soil (mg/kg)

SIR = soil ingestion rate (kg/day)

Estimated daily intake from ingestion of soil by beef

$$EDI_{soil} = Cs \times SIR$$
$$EDI_{soil} = 6.6E-05 \times 5.2E-01$$
$$EDI_{soil} = 3.4E-04 \ mg / day$$

Consumption of Browse

$$EDI_{browse} = P_{total} \times FIR_{browse}$$

Where:

EDI_{browse} = estimated daily intake of chemical in browse (mg/day)

P_{total} = chemical concentration in browse from deposition, vapour uptake and root uptake (mg/kg DW)

FIR_{browse} = browse ingestion rate (kg/day)

Estimated daily intake from consumption of browse by beef

$$EDI_{browse} = P_{total} \times FIR_{browse}$$
$$EDI_{browse} = 1.2E-03 \times 1.3E+01$$
$$EDI_{browse} = 1.6E-02 \ \ mg/day$$

Consumption of Terrestrial Invertebrates

$$EDI_{invert} = C_{invert} \times FIR_{invert}$$

Where:

EDI_{invert} = estimated daily intake of chemical in terrestrial invertebrates (mg/day)

C_{invert} = chemical concentration in terrestrial invertebrates (mg/kg DW)

FIR_{invert} = terrestrial invertebrate ingestion rate (kg/day)

Given that beef were not assumed to consume terrestrial invertebrates, the chicken was used in the sample calculation below.

Estimated daily intake from consumption of terrestrial invertebrates by chickens

$$EDI_{invert} = C_{invert} \times FIR_{invert}$$
$$EDI_{invert} = 2.8E-05 \times 7.9E-02$$
$$EDI_{invert} = 2.2E-06 \ \ mg/day$$

Ingestion of Water

$$EDI_{water} = Csw \times WIR$$

Where:

EDI_{water} = estimated daily intake of chemical in surface water (mg/day)

Csw = chemical concentration in surface water (mg/L)

WIR = water ingestion rate (L/day)

Estimated daily intake from ingestion of surface water by beef

$$EDI_{water} = Csw \times WIR$$
$$EDI_{water} = (4.1E-11) \times (4.5E+01)$$
$$EDI_{water} = 1.9E-09 \ \ mg/day$$

Inhalation of Air

$$EDI_{inh} = C_{air} \times AIR$$

Where:

EDI_{inh} = estimated daily intake of chemical via inhalation (mg/day)

C_{air} = chemical concentration in air (mg/m^3)

AIR = air inhalation rate (m^3/day)

Estimated daily intake via inhalation by beef

$$EDI_{inh} = C_{air} \times AIR$$
$$EDI_{inh} = 1.77E-08x5.4E+01$$
$$EDI_{inh} = 9.6E-07 \ \ mg/day$$

Total Estimated Daily Intake

The estimated daily intake from all potential pathways of exposure was calculated as follows:

$$EDI_{total} = EDI_{soil} + EDI_{sed} + EDI_{food} + EDI_{water} + EDI_{inh}$$

Where:

EDI_{total} = total estimated daily intake of chemical via all routes of exposure (mg/day)

EDI_{soil} = estimated daily intake of chemical from ingestion of soil (mg/day)

EDI_{sed} = estimated daily intake of chemical from ingestion of sediment (mg/day)

EDI_{food} = estimated daily intake of chemical from consumption of all foods (mg/day)

EDI_{water} = estimated daily intake of chemical from ingestion of water (mg/day)

EDI_{inh} = estimated daily intake of chemical from inhalation of air (mg/day)

Total estimated daily intake from all routes of exposure for beef

$$EDI_{total} = EDI_{soil} + +EDI_{food} + EDI_{water} + EDI_{inh}$$
$$EDI_{total} = 3.4E-04 + 1.6E-02 1.9E-09 + 9.6E-08$$
$$EDI_{total} = 1.6E-02 mg/day$$

The total estimated daily intake from all routes of exposure was normalized to body weight as follows:

$$EDI_{total\_bw} = \frac{EDI_{total}}{BW}$$

Where:

EDI_{total_bw} = normalized total estimated daily intake of chemical via all routes of exposure (mg/kg bw/day)

EDI_{total} = total estimated daily intake of chemical via all routes of exposure (mg/day)

BW = body weight (kg)

Normalized total estimated daily intake from all routes of exposure for beef

$$EDI_{total\_bw} = \frac{EDI_{total}}{BW}$$
$$EDI_{total\_bw} = \frac{1.6E-02}{570}$$
$$EDI_{total\_bw} = 2.8E-05 \ mg/kg\ bw/day$$

Predicted Tissue Concentrations

Biotransfer Factor

Biotransfer factors (BTFs) are used to translate an estimated dose of a chemical to a tissue concentration. BTF values were taken from U.S. EPA OSW (2005) or Baes et al. (1984). For certain COPCs, BTF values were not available and were predicted using the following equation (U.S. EPA OSW 2005).

$$\log BTF = -0.099 \times \log K_{ow}{}^2 + 1.07 \times \log K_{ow} - 3.56$$

Where:

BTF = biotransfer factor ([mg/kg fat]/[mg/day] WW)

$logK_{ow}$ = log of the octanol-water partition coefficient (unitless)

Biotransfer factor for benzo(a)pyrene

$$\log BTF = -0.099 \times \log K_{ow}{}^{2} + 1.07 \times \log K_{ow} - 3.56$$
$$\log BTF = -0.099 \times \log(1.0E+06)^{2} + 1.07 \times \log(1.0E+06) - 3.56$$
$$BTF = 1.9E-01 (mg/kg \cdot fat)(mg/day)\ WW$$

The BTF was adjusted to account for the amount of fat in the tissue by adjusting the BTF with the fat content of desired tissue (e.g., beef, chicken or milk). The assumed fat contents for the different species were taken from the U.S. EPA OSW (2005). The BTF was adjusted for the fat content in tissue by the following equation.

$$BTF_a = BTF \times FC$$

Where:

BTF_a = adjusted biotransfer factor for fat content of tissue ([mg/kg-tissue]/[mg/day] WW)

BTF = biotransfer factor ([mg/kg-fat]/[mg/day] WW)

FC = fat content of tissue (%)

Adjusted biotransfer factor for the fat content of tissue in beef

$$BTF_a = BTF \times FC$$
$$BTF_a = 1.9E-01 \times 0.19$$
$$BTF_a = 3.6E-02\,(mg/kg \cdot tissue)/(mg/day)\ WW$$

As provided in the methodology for predicting cattle BTFs (RTI 2005, U.S. EPA OSW 2005), the equation that is used to estimate BTF values may overestimate biotransfer of highly metabolized chemicals. Depending on the compound, lipophilicity or K_{ow} measures are not always a good predictor of tissue concentrations (Hofelt et al. 2001).

Evidence strongly suggests that PAHs are extensively metabolized and eliminated (Ramesh et al. 2004). Laurent et al. (2001, 2002) and Grova et al. (2002) investigated the transfer of PAHs in the food chain to livestock for goats and pigs. These studies demonstrate that PAHs are poorly absorbed from diet or readily metabolized and excreted. Hofelt et al. (2001)

overcame these limitations for human health assessment by deriving PAH metabolism factors (MF) for use in multipathway risk assessment. The recommended MF value of 0.01 for PAHs was used in the assessment as follows.

$$BTF_{adj} = BTF_a \times MF$$

Where:

BTF_{adj} = adjusted biotransfer factor for metabolism ([mg/kg-tissue]/[mg/day] WW)

BTF_a = adjusted biotransfer factor for fat content of tissue ([mg/kg-tissue]/[mg/day] WW)

MF = metabolism factor (unitless)

Adjusted biotransfer factor for the fat content of tissue in beef

$$BTF_{adj} = BTF_a \times MF$$
$$BTF_{adj} = 3.6E-02 \times 0.01$$
$$BTF_{adj} = 3.6E-04\,(mg/kg \cdot tissue)/(mg/day)\,WW$$

Tissue Concentration

Chemical concentrations in livestock tissue were predicted based on the following equation:

$$C_{animal} = BTF_{adj} \times EDI_{total}$$

Where:

C_{animal} = chemical concentration in animal (mg/kg wet weight [WW])

BTF_{adj} = adjusted biotransfer factor for metabolism ([mg/kg-tissue]/[mg/day] WW)

EDI_{total} = total estimated daily intake of chemical via all routes of exposure (mg/day)

Predicted concentration of benzo(a)pyrene in beef

$$C_{animal} = BTF_{adj} \times EDI_{total}$$
$$C_{animal} = 3.6E-04 \times 2.9E-05$$
$$C_{animal} = 6.1E-06\ \ mg/kg\ WW$$

Human Exposure Estimates

Incidental Ingestion of Soil

The following equation was used to estimate human exposure via incidental ingestion of soil. Soil ingestion rates were based on recommendations from Health Canada (2004).

$$EDI_{soil} = Cs \times SIR$$

Where:

EDI_{soil} = estimated daily intake of chemical via ingestion of surface soil (µg/day)

Cs = chemical concentration in soil (mg/kg or µg/g)

SIR = incidental soil ingestion rate (g/day)

Estimated daily intake from incidental ingestion of soil by an adult

$$EDI_{soil} = Cs \times SIR$$
$$EDI_{soil} = 6.6E-04 \times 0.02$$
$$EDI_{soil} = 1.3E-05\ \mu g/day$$

Inhalation of Dust

The following equation was used to estimate human exposure via inhalation of dust.

$$EDI_{dust} = C_{dust} \times AIR$$

Where:

EDI_{dust} = estimated daily intake of chemical via inhalation of dust (µg/day)

C_{dust} = chemical concentration in dust (µg/m^3)

AIR = air inhalation rate (m^3/day)

Estimated daily intake from inhalation of dust by an adult

$$EDI_{dust} = C_{dust} \times AIR$$
$$EDI_{dust} = 5.0E-10 \times 15.8$$
$$EDI_{dust} = 7.9E-09\ \ \mu g/day$$

Consumption of Natural and Country Foods

Leafy Vegetables and Plants

The following equation was used to estimate human exposure via consumption of leafy vegetables and plants. Consumption rates were obtained from Health Canada (2004).

$$EDI_{plant} = (Pd + Pv + \mathrm{Pr}) \times IR_{plant}$$

Where:

EDI_{plant} = estimated daily intake of chemical via consumption of aboveground leafy plants (µg/day)

Pd = chemical concentration in aboveground plants from direct deposition (mg/kg or µg/g WW)

Pv = chemical concentration in aboveground plants from vapour uptake (mg/kg or µg/g WW)

Pr = chemical concentration in aboveground plants from root uptake (mg/kg or µg/g WW)

IR_{plant} = leafy plant ingestion rate (g/day)

Estimated daily intake from consumption of aboveground leafy vegetables and plants by an adult

$$EDI_{plant} = (Pd + Pv + \mathrm{Pr}) \times IR_{plant}$$
$$EDI_{plant} = (2.1E-05 + 6.7E-07 + 2.96E-07) \times 137$$
$$EDI_{plant} = 3.0E-03\,\mu g/day$$

Root Vegetables and Cattail

The following equations were used to estimate human exposure via consumption of root vegetables or cattail. Consumption rates were obtained from Health Canada (1994, 2004).

Estimated exposure from consumption of root vegetables was calculated as follows:

$$EDI_{root} = \mathrm{Pr}_{root} \times IR_{root}$$

Where:

EDI_{root} = estimated daily intake of chemical via consumption of root vegetables (µg/day)

Pr_{root} = chemical concentration in root vegetables from root uptake (mg/kg or µg/g WW)

IR_{root} = root vegetable ingestion rate (g/day)

Estimated daily intake from consumption of root vegetables by an adult

$$EDI_{root} = \mathrm{Pr}_{root} \times IR_{root}$$
$$EDI_{root} = 6.6E-08 \times 188$$
$$EDI_{root} = 1.2E-05 \ \ \mu g/day$$

Fruit and Berries

The following equation was used to estimate human exposure via consumption of fruit and berries. Consumption rates were obtained from Health Canada (1994).

$$EDI_{berry} = Pb \times IR_{berry}$$

Where:

EDI_{berry} = estimated daily intake of chemical via consumption of fruit and berries (µg/day)

Pb = chemical concentration in fruit and berries (mg/kg or µg/g WW)

IR_{berry} = fruit and/or berry ingestion rate (g/day)

Estimated daily intake from consumption of fruit by an adult

$$EDI_{berry} = Pb \times IR_{berry}$$
$$EDI_{berry} = 2.3E-07 \times 46$$
$$EDI_{berry} = 1.1E-05 \ \ \mu g/day$$

Dermal Exposure

Potential dermal exposure was estimated by applying soil loading rates to exposed skin, skin surface areas and dermal absorption factors to measured and predicted soil concentrations. Dermal exposures were estimated separately for hands only and for surfaces other than hands.

Dermal Exposure for Hands

The following equation was used to estimate dermal exposure for hands only.

$$EDI_{dermal\_h} = Cs \times SAH \times SLH \times RAF_{dermal}$$

Where:

EDI_{dermal_h} = estimated daily intake of chemical from dermal contact of hands with soil (µg/day)

Cs = chemical concentration in surface soil (mg/kg)

SAH = skin surface area of hands (cm^2)

SLH = soil loading rate to exposed skin on hands (g/cm^2/event)

RAF_{dermal} = relative dermal absorption factor (%)

Estimated daily intake from dermal exposure of hands only for an adult

$$EDI_{dermal\_h} = Cs \times SAH \times SLH \times RAF_{dermal}$$
$$EDI_{dermal\_h} = 6.6E-04 \times 890 \times 0.0001 \times 0.2$$
$$EDI_{dermal\_h} = 1.1E-05\ \mu g/day$$

Dermal Exposure for Surfaces Other Than Hands

The following equation was used to estimate dermal exposure for surfaces other than hands.

$$EDI_{dermal\_o} = Cs \times SAO \times SLO \times RAF_{dermal}$$

Where:

EDI_{dermal_o} = estimated daily intake of chemical from dermal contact of surfaces other than hands with soil (µg/day)

Cs = chemical concentration in surface soil (mg/kg)

SAO = skin surface area of upper and lower arms and legs (cm^2)

SLH = soil loading rate to exposed skin on surfaces other than hands (g/cm^2/event)

RAF_{dermal} = relative dermal absorption factor (%)

Estimated daily intake from dermal exposure of surfaces other than hands only for an adult

$$EDI_{dermal\_o} = Cs \times SAO \times SLO \times RAF_{dermal}$$
$$EDI_{dermal\_o} = 6.6E-04 \times 8200 \times 0.00001 \times 0.2$$
$$EDI_{dermal\_o} = 1.1E-05 \ \mu g / day$$

Consumption of Breast Milk

The estimated exposure from consumption of breast milk was calculated as the product of the breast milk consumption rate and predicted chemical concentration in breast milk. The equations used to predict the chemical concentration in breast milk are described following.

Breast Milk Biotransfer Factor

The biotransfer factor for breast milk was used to convert the adult mother's total predicted exposure to a chemical concentration in her breast milk. The maximum fraction of the chemical expected to bioaccumulate was calculated using the following approach (McKone 1992):

$$BTF_{BM} = 2.0 \times 10^{-7} \times K_{ow}$$

Where:

BTF_{BM} = breast milk biotransfer factor ([µg/kg-milk]/[µg/day-intake])

K_{ow} = octanol-water partition coefficient

Breast milk biotransfer factor

$$BTF_{BM} = 2.0E-07 \times K_{ow}$$
$$BTF_{BM} = 2.0E-07 \times 1.00E+6$$
$$BTF_{BM} = 0.2 \ (\mu g / kg \cdot milk) / (\mu g / day \cdot in take)$$

Chemical Concentration in Breast Milk

The predicted breast milk concentration was calculated as follows:

$$C_{BM} = \frac{EDI_{mother} \times BW \times BTF_{BM}}{CF}$$

Where:

CBM = predicted concentration of chemical in breast milk (µg/g milk)

EDI_{mother} = mother's total daily exposure to chemical via all routes (µg/kg/day)

BW = body weight of mother (kg)

BTF_{BM} = breast milk biotransfer factor ([µg/kg-milk]/[µg/day-intake])

CF = unit conversion factor (g/kg)

Concentration of breast milk

$$C_{BM} = \frac{EDI_{mother} \times BW \times BTF_{BM}}{CF}$$

$$C_{BM} = \frac{5.7E-05 \times 70.7 \times 0.2}{1000}$$

$$C_{BM} = 8.1E-07 \ \ \mu g / g \cdot milk$$

Breast Milk Consumption

The estimated exposure from consumption of breast milk for infants was calculated as follows:

$$EDI_{BM} = C_{BM} \times IR_{BM}$$

Where:

EDI_{BM} = estimated daily intake of chemical from consumption of breast milk (µg/day)

C_{BM} = concentration of chemical in breast milk (µg/g milk)

IR_{BM} = breast milk ingestion rate (g/day)

Given that only infants were assumed to consume breast milk, the sample calculation below is based on an infant.

Estimated daily intake from breast milk consumption for an infant

$$EDI_{BM} = C_{BM} \times IR_{BM}$$

$$EDI_{BM} = 8.1E-07 \times 545$$

$$EDI_{BM} = 4.4E-04 \ \ \mu g / day$$

Total Estimated Exposure

Total exposure was calculated by summing the individual exposures from each medium (i.e., soil, water, dust, vegetation) for all relevant exposure pathways on a chemical-by-chemical and receptor-by-receptor basis:

$$EDI_{total} = EDI_{soil} + EDI_{dust} + EDI_{food} + EDI_{dermal} + EDI_{BM}$$

Where:

EDI_{total} = total estimated daily intake of chemical via all routes (µg/day)

EDI_{soil} = estimated daily intake of chemical from soil ingestion (µg/day)

EDI_{water} = estimated daily intake of chemical from water ingestion (µg/day)

EDI_{dust} = estimated daily intake of chemical from dust inhalation (µg/day)

EDI_{food} = estimated daily intake of chemical from consumption of all food types (µg/day)

EDI_{dermal} = estimated daily intake of chemical from dermal contact for hands only and surfaces other than hands (µg/day)

EDI_{BM} = estimated daily intake of chemical from breast milk consumption (µg/day)

Total estimated daily intake from all routes of exposure for an adult

$$EDI_{total} = EDI_{soil} + EDI_{dust} + EDI_{food} + EDI_{dermal} + EDI_{BM}$$
$$EDI_{total} = 1.E-05 + 7.9E-09 + 4.0E-039 + 2.2E-05 + 0$$
$$EDI_{total} = 4.5E-03 \ \mu g/day$$

The total estimated daily intake was normalized to body weight as follows:

$$EDI_{total\_bw} = \frac{EDI_{total}}{BW}$$

Where:

EDI_{total_bw} = total estimated daily intake of chemical via all routes adjusted to body weight (µg/kg bw/day)

EDI_{total} = total estimated daily intake of chemical via all routes (µg/day)

BW = body weight (kg)

Total estimated daily intake from all routes of exposure adjusted to body weight for an adult

$$EDI_{total\_bw} = \frac{EDI_{total}}{BW}$$

$$EDI_{total\_bw} = \frac{4.5E-03}{70.7}$$

$$EDI_{total\_bw} = 6.0E-05 \ \mu g/kg\ bw/day$$

Human Risk Calculations

Lifetime cancer risks (LCRs) and incremental lifetime cancer risks (ILCRs) for carcinogens were estimated using the following equations and the calculated exposure estimates.

Carcinogens

The following equation was used to calculate the lifetime cancer risks and incremental lifetime cancer risks for carcinogens.

$$LCR_i \text{ or } ILCR_i = \left(\frac{EDI_{total\_bw}}{RsD}\right) \times LAF_i$$

Where:

LCR_i or $ILCR_i$	=	lifetime cancer risk or incremental lifetime cancer risk for the '*i*' lifestage (unitless)
EDI_{total_bw}	=	total estimated daily intake of chemical via all routes adjusted to body weight for the '*i*' lifestage (µg/kg bw/day)
RsD	=	chemical-specific risk-specific dose (µg/kg bw/day)
LAF_i	=	life adjustment factor for the '*i*' lifestage (yr-lifestage/yr-lifespan)

Incremental lifetime cancer risk from Project emission sources for an adult

$$ILCR_{adult} = \left(\frac{EDI_{total\_bw}}{RsD} \right) \times LAF_{adult}$$

$$ILCR_{adult} = \left(\frac{5.5E-05}{3.4E-03} \right) \times 7.47E-01$$

$$ILCR_{adult} = 3.9E-02$$

For carcinogens, cancer risks were presented for lifetime exposure using a composite receptor. The cancer risk for the composite receptor was calculated by summing the cancer risks for each lifestage.

$$LCR_{composite} = \sum LCR_i$$

or

$$ILCR_{composite} = \sum ILCR_i$$

Where:

$LCR_{composite}$ or $ILCR_{composite}$ = lifetime cancer risk or incremental lifetime cancer risk for a composite receptor (unitless)

LCR_i or $ILCR_i$ = lifetime cancer risk or incremental lifetime cancer risk for the '*i*' lifestage (unitless)

Incremental lifetime cancer risk from Project emissions for a composite receptor

$$ILCR_{composite} = ILCR_{adult} + ILCR_{adolescent} + ILCR_{child} + ILCR_{toddler} + ILCR_{infant}$$

$$ILCR_{composite} = 1.2E-02 + 2.0E-03 + 2.7E-03 + 2.1E-03 + 1.5E-03$$

$$ILCR_{composite} = 2.0E-02$$

C. All soil and tissue concentrations in the multiple-pathway exposure model were predicted due to a lack of detectable data. The chemicals for potential concern (COPC) for the multiple-pathway assessment for this Project were benzo(a)pyrene using the whole mixture model and benzo(a)pyrene using the individual PAH model or TEQ approach. As such, PAHs were the only COPCs assessed through multiple routes of exposure. Area measurements of soil and vegetation have found that PAHs are uniformly less than their analytical detection limits. Data collected in support of the applications for the North West Upgrader, Petro-Canada Sturgeon Upgrader, StatoilHydro Upgrader and TOTAL Upgrader are summarized in Table 10-1 and Table 10-2 below.

Table 10-1: Summary of Measured Soil PAH Concentrations

	North West Upgrader (NorthWest 2007)	Petro-Canada Sturgeon Upgrader	StatoilHydro Upgrader (StatoilHydro 2007)	TOTAL upgrader (TOTAL 2007)
Sample Number	*N=9*	*N=4*	*N=6*	*N=11*
Units	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw
3-methylcholanthrene	< 0.01	< 0.01	NA	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01	< 0.01	NA	< 0.01
Acenaphthene	< 0.01	< 0.01	NA	< 0.01
Acenaphthylene	< 0.01	< 0.01	NA	< 0.01
Benzo(a)anthracene	< 0.01	< 0.01	<0.05	< 0.01
Benzo(a)pyrene	< 0.01	< 0.01	<0.05	< 0.01
Benzo(b)fluoranthene	< 0.01	< 0.01	<0.05	< 0.01
Benzo(c)phenanthrene	< 0.01	< 0.01	NA	< 0.01
Benzo(g,h,i)perylene	< 0.01	< 0.01	NA	< 0.01
Benzo(j)fluoranthene	< 0.01	< 0.01	<0.05	< 0.01
Benzo(k)fluoranthene	< 0.01	< 0.01	<0.05	< 0.01
Chrysene	< 0.01	< 0.01	<0.05	< 0.01
Dibenzo(a,h)anthracene	< 0.01	< 0.01	<0.05	< 0.01
Dibenzo(a,h/a,i/a,l)pyrene	< 0.01	< 0.01	NA	< 0.01
Fluoranthene	< 0.01	< 0.01	NA	< 0.01
Fluorene	< 0.01	< 0.01	NA	< 0.01
Indeno(1,2,3-cd)pyrene	< 0.01	< 0.01	NA	< 0.01
Naphthalene	< 0.01	< 0.01	NA	< 0.01
Phenanthrene	< 0.01	< 0.01	NA	< 0.01
Pyrene	< 0.01	< 0.01	NA	< 0.01

Note:
NA: Data not available for these parameters.

Table 10-2: Summary of Measured Vegetation PAH Concentrations

	NorthWest Upgrader (NorthWest 2007)	Petro-Canada Sturgeon Upgrader	StatoilHydro Upgrader (StatoilHydro 2007)	TOTAL upgrader (TOTAL 2007)
Sample Number	*N=17*	*N=7*	*N=7*	*N=11*
Units	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw
3-Methylcholanthrene	<0.01 – < 0.02	< 0.01	NA	<0.01 – < 0.02
7,12-Dimethylbenz(a)anthracene	<0.01 – < 0.02	< 0.01	NA	<0.01 – < 0.02
2-Methylnaphthalene	NA	NA	<0.019 - < 0.18	
Acenaphthene	<0.01 – < 0.02	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Acenaphthylene	<0.01 – < 0.02	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Acridine	NA	NA	< 0.037 – < 0.36	NA
Anthracene	<0.01 – <0.04	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Benzo(a)anthracene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Benzo(a)pyrene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Benzo(b&j)fluoranthene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Benzo(c)phenanthrene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Benzo(g,h,i)perylene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Benzo(k)fluoranthene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – 0.02
Benzo[e]pyrene	NA	< 0.01	<0.019 - < 0.18	NA
Chrysene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Dibenz(a,h)anthracene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Dibenzo(a,e)pyrene	NA	NA	<0.019 - < 0.18	NA
Dibenzo(a,h)pyrene	NA	NA	<0.019 - < 0.18	NA
Dibenzo(a,i)pyrene	NA	NA	<0.019 - < 0.18	NA
Dibenzo(a,l)pyrene	NA	NA	<0.019 - < 0.18	NA
Fluoranthene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Fluorene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Indeno(1,2,3-cd)pyrene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Naphthalene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Perylene	NA	NA	<0.019 - < 0.18	NA
Phenanthrene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02
Pyrene	< 0.01	< 0.01	<0.019 - < 0.18	<0.01 – < 0.02

Note:
NA: Data not available for these parameters.

In his book “Nondetects and Data Analysis: Statistics for Censored Environmental Data”, Helsel (2005) states that estimating statistics are unreliable when more than 80% of the samples are reported to be non-detect. In the case of the soil and plant samples collected from the Industrial Heartland, 100% were found to have non-detect levels of VOCs and PAHs. As such, due to the lack of a substantial database of detectable data for PAHs, COPC concentrations were predicted in the multiple-pathway model for this Project.

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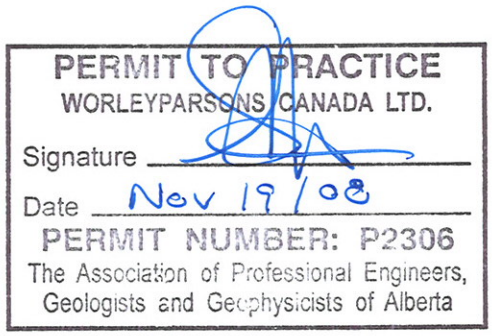
We trust that this letter adequately addresses your additional SIRs. If you have any questions or additional information requirements, please contact the undersigned.

Sincerely,
WorleyParsons
Infrastructure & Environment

Gordon Johnson, M.Sc., P.Eng.
Global Lead - Environment



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Attachment 1: Summary of predicted exposures and tissue concentrations

Table B2-1 Summary of predicted exposures and tissue concentrations for each ecological receptor, scenario, location and chemical

									Environmental Concentrations					EDI									
Case	Site	Receptor	Chemical	Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Air ug/m^3	Deposition mg/m^2/yr	Browse Deposition mg/kg dw	Browse Air mg/kg dw	Browse Soil mg/kg dw	Aquatic Plant Aquatic mg/kg dw	Invert Soil mg/kg dw	Soil EDI mg/day	Browse EDI mg/day	Aquatic Plant EDI mg/day	Invert EDI mg/day	Water EDI mg/day	Air EDI mg/day	Total EDI mg/day	Total EDI mg/kg-BW/day	Tissue Concentration mg/kg ww
Application	MAX	Beef	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	1.25E-05	1.08E-04	0.00E+00	0.00E+00	2.43E-09	2.81E-06	1.23E-04	2.17E-07	4.16E-08
Application	MAX	Beef	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	1.72E-04	7.05E-03	0.00E+00	0.00E+00	2.51E-09	8.01E-07	7.22E-03	1.27E-05	2.88E-06
Application	MAX	Beef	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	3.42E-04	1.59E-02	0.00E+00	0.00E+00	1.87E-09	9.57E-07	1.63E-02	2.87E-05	6.11E-06
Application	MAX	Beef	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	5.25E-04	1.16E-02	0.00E+00	0.00E+00	4.39E-08	1.50E-05	1.22E-02	2.15E-05	4.40E-06
Application	MAX	Beef	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	1.86E-04	8.36E-02	0.00E+00	0.00E+00	2.06E-08	3.81E-07	8.38E-02	1.48E-04	1.60E-05
Application	MAX	Beef	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	1.05E-04	1.87E-03	0.00E+00	0.00E+00	4.83E-10	8.91E-08	1.98E-03	3.48E-06	7.20E-07
Application	MAX	Beef	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	1.89E-04	1.02E-03	0.00E+00	0.00E+00	2.76E-09	2.84E-07	1.21E-03	2.13E-06	4.83E-07
Application	MAX	Beef	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	5.11E-05	8.53E-04	0.00E+00	0.00E+00	4.08E-09	3.39E-06	9.07E-04	1.60E-06	3.56E-07
Application	MAX	Beef	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	1.26E-06	2.22E-05	0.00E+00	0.00E+00	5.28E-10	4.34E-06	2.78E-05	4.90E-08	8.14E-09
Application	MAX	Beef	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	5.22E-05	1.40E-03	0.00E+00	0.00E+00	8.64E-11	1.02E-07	1.45E-03	2.57E-06	4.28E-07
Application	MAX	Beef	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	2.32E-05	3.23E-04	0.00E+00	0.00E+00	5.49E-09	7.45E-06	3.54E-04	6.24E-07	1.20E-07
Application	MAX	Beef	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	1.00E-04	1.28E-04	0.00E+00	0.00E+00	9.24E-09	4.71E-07	2.29E-04	4.04E-07	8.81E-08
Application	MAX	Chicken	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	1.69E-06	5.20E-06	0.00E+00	8.00E-08	1.70E-11	4.31E-08	7.02E-06	2.81E-06	1.75E-09
Application	MAX	Chicken	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	2.34E-05	3.40E-04	0.00E+00	4.73E-07	1.76E-11	1.23E-08	3.64E-04	1.46E-04	1.07E-07
Application	MAX	Chicken	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	4.65E-05	7.68E-04	0.00E+00	2.20E-06	1.31E-11	1.47E-08	8.17E-04	3.27E-04	2.26E-07
Application	MAX	Chicken	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	7.14E-05	5.61E-04	0.00E+00	3.37E-06	3.08E-10	2.31E-07	6.36E-04	2.55E-04	1.70E-07
Application	MAX	Chicken	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	2.53E-05	4.04E-03	0.00E+00	1.19E-06	1.44E-10	5.85E-09	4.06E-03	1.63E-03	5.70E-07
Application	MAX	Chicken	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	1.42E-05	9.03E-05	0.00E+00	7.69E-07	3.38E-12	1.37E-09	1.05E-04	4.21E-05	2.83E-08
Application	MAX	Chicken	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	2.56E-05	4.93E-05	0.00E+00	1.21E-06	1.93E-11	4.36E-09	7.61E-05	3.04E-05	2.24E-08
Application	MAX	Chicken	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	6.96E-06	4.12E-05	0.00E+00	3.29E-07	2.85E-11	5.20E-08	4.85E-05	1.94E-05	1.40E-08
Application	MAX	Chicken	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	1.72E-07	1.07E-06	0.00E+00	8.12E-09	3.70E-12	6.66E-08	1.32E-06	5.28E-07	2.84E-10
Application	MAX	Chicken	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	7.10E-06	6.77E-05	0.00E+00	3.83E-07	6.05E-13	1.56E-09	7.52E-05	3.01E-05	1.63E-08
Application	MAX	Chicken	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	3.15E-06	1.56E-05	0.00E+00	1.49E-07	3.84E-11	1.14E-07	1.90E-05	7.60E-06	4.74E-09
Application	MAX	Chicken	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	1.36E-05	6.20E-06	0.00E+00	6.43E-07	6.47E-11	7.23E-09	2.05E-05	8.19E-06	5.80E-09
Application	MAX	Dairy	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	1.25E-05	1.08E-04	0.00E+00	0.00E+00	7.28E-09	2.81E-06	1.23E-04	2.17E-07	8.75E-09
Application	MAX	Dairy	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	1.72E-04	7.05E-03	0.00E+00	0.00E+00	7.54E-09	8.01E-07	7.22E-03	1.27E-05	6.07E-07
Application	MAX	Dairy	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	3.42E-04	1.59E-02	0.00E+00	0.00E+00	5.62E-09	9.57E-07	1.63E-02	2.87E-05	1.29E-06
Application	MAX	Dairy	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	5.25E-04	1.16E-02	0.00E+00	0.00E+00	1.32E-07	1.50E-05	1.22E-02	2.15E-05	9.27E-07
Application	MAX	Dairy	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	1.86E-04	8.36E-02	0.00E+00	0.00E+00	6.17E-08	3.81E-07	8.38E-02	1.48E-04	3.36E-06
Application	MAX	Dairy	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	1.05E-04	1.87E-03	0.00E+00	0.00E+00	1.45E-09	8.91E-08	1.98E-03	3.48E-06	1.52E-07
Application	MAX	Dairy	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	1.89E-04	1.02E-03	0.00E+00	0.00E+00	8.27E-09	2.84E-07	1.21E-03	2.13E-06	1.02E-07
Application	MAX	Dairy	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	5.11E-05	8.53E-04	0.00E+00	0.00E+00	1.22E-08	3.39E-06	9.07E-04	1.60E-06	7.49E-08
Application	MAX	Dairy	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	1.26E-06	2.22E-05	0.00E+00	0.00E+00	1.58E-09	4.34E-06	2.78E-05	4.90E-08	1.71E-09
Application	MAX	Dairy	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	5.22E-05	1.40E-03	0.00E+00	0.00E+00	2.59E-10	1.02E-07	1.45E-03	2.57E-06	9.00E-08
Application	MAX	Dairy	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	2.32E-05	3.23E-04	0.00E+00	0.00E+00	1.65E-08	7.45E-06	3.54E-04	6.24E-07	2.52E-08
Application	MAX	Dairy	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	1.00E-04	1.28E-04	0.00E+00	0.00E+00	2.77E-08	4.71E-07	2.29E-04	4.04E-07	1.85E-08
Application	MAX	Eggs	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	1.10E-06	3.39E-06	0.00E+00	5.21E-08	1.70E-11	3.06E-08	4.58E-06	2.86E-06	6.52E-10
Application	MAX	Eggs	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	1.52E-05	2.22E-04	0.00E+00	3.09E-07	1.76E-11	8.72E-09	2.37E-04	1.48E-04	3.99E-08
Application	MAX	Eggs	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	3.03E-05	5.01E-04	0.00E+00	1.43E-06	1.31E-11	1.04E-08	5.32E-04	3.33E-04	8.42E-08
Application	MAX	Eggs	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	4.65E-05	3.66E-04	0.00E+00	2.20E-06	3.08E-10	1.64E-07	4.15E-04	2.59E-04	6.32E-08
Application	MAX	Eggs	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	1.65E-05	2.63E-03	0.00E+00	7.79E-07	1.44E-10	4.15E-09	2.65E-03	1.66E-03	2.12E-07
Application	MAX	Eggs	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	9.28E-06	5.89E-05	0.00E+00	5.01E-07	3.38E-12	9.70E-10	6.86E-05	4.29E-05	1.05E-08
Application	MAX	Eggs	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	1.67E-05	3.21E-05	0.00E+00	7.89E-07	1.93E-11	3.10E-09	4.96E-05	3.10E-05	8.34E-09
Application	MAX	Eggs	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	4.53E-06	2.68E-05	0.00E+00	2.14E-07	2.85E-11	3.69E-08	3.16E-05	1.98E-05	5.22E-09
Application	MAX	Eggs	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	1.12E-07	6.99E-07	0.00E+00	5.29E-09	3.70E-12	4.72E-08	8.63E-07	5.40E-07	1.06E-10
Application	MAX	Eggs	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	4.63E-06	4.41E-05	0.00E+00	2.50E-07	6.05E-13	1.11E-09	4.90E-05	3.06E-05	6.07E-09
Application	MAX	Eggs	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	2.05E-06	1.02E-05	0.00E+00	9.70E-08	3.84E-11	8.11E-08	1.24E-05	7.75E-06	1.76E-09
Application	MAX	Eggs	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	8.87E-06	4.04E-06	0.00E+00	4.19E-07	6.47E-11	5.13E-09	1.33E-05	8.34E-06	2.16E-09
Application	MAX	Moose	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	6.23E-06	7.42E-05	3.31E-06	0.00E+00	1.29E-09	2.35E-06	8.61E-05	1.91E-07	2.91E-08
Application	MAX	Moose	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	8.61E-05	4.85E-03	3.43E-06	0.00E+00	1.34E-09	6.70E-07	4.94E-03	1.10E-05	1.97E-06
Application	MAX	Moose	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	1.71E-04	1.10E-02	2.56E-06	0.00E+00	9.97E-10	8.01E-07	1.11E-02	2.47E-05	4.18E-06
Application	MAX	Moose	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	2.63E-04	8.01E-03	6.00E-05	0.00E+00	2.34E-08	1.26E-05	8.35E-03	1.86E-05	3.02E-06
Application	MAX	Moose	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	9.31E-05	5.76E-02	2.81E-05	0.00E+00	1.09E-08	3.19E-07	5.78E-02	1.28E-04	1.10E-05
Application	MAX	Moose	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	5.24E-05	1.29E-03	6.60E-07	0.00E+00	2.57E-10	7.46E-08	1.34E-03	2.98E-06	4.89E-07
Application	MAX	Moose	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	9.44E-05	7.03E-04	3.76E-06	0.00E+00	1.47E-09	2.38E-07	8.01E-04	1.78E-06	3.20E-07
Application	MAX	Moose	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	2.56E-05	5.88E-04	5.57E-06	0.00E+00	2.17E-09	2.84E-06	6.22E-04	1.38E-06	2.44E-07
Application	MAX	Moose	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	6.33E-07	1.53E-05	7.21E-07	0.00E+00	2.81E-10	3.63E-06	2.03E-05	4.51E-08	5.94E-09
Application	MAX	Moose	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	2.61E-05	9.66E-04	1.18E-07	0.00E+00	4.59E-11	8.51E-08	9.93E-04	2.21E-06	2.92E-07
Application	MAX	Moose	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	1.16E-05	2.23E-04	7.50E-06	0.00E+00	2.92E-09	6.24E-06	2.48E-04	5.51E-07	8.38E-08
Application	MAX	Moose	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	5.01E-05	8.85E-05	1.26E-05	0.00E+00	4.92E-09	3.94E-07	1.52E-04	3.37E-07	5.83E-08
Application	MAX	Ruffed_grouse	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	4.66E-07	1.54E-06	0.00E+00	2.37E-08	2.48E-12	1.62E-08	2.04E-06	2.91E-06	5.09E-10
Application	MAX	Ruffed_grouse	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	6.43E-06	1.01E-04	0.00E+00	1.40E-07	2.57E-12	4.62E-09	1.07E-04	1.53E-04	3.15E-08
Application	MAX	Ruffed_grouse	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	1.28E-05	2.27E-04	0.00E+00	6.50E-07	1.92E-12	5.52E-09	2.41E-04	3.43E-04	6.66E-08
Application	MAX	Ruffed_grouse	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	1.96E-05	1.66E-04	0.00E+00	9.97E-07	4.50E-11	8.69E-08	1.87E-04	2.66E-04	4.98E-08
Application	MAX	Ruffed_grouse	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	6.96E-06	1.19E-03	0.00E+00	3.53E-07	2.11E-11	2.20E-09	1.20E-03	1.71E-03	1.69E-07
Application	MAX	Ruffed_grouse	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	3.92E-06	2.67E-05	0.00E+00	2.27E-07	4.95E-13	5.14E-10	3.09E-05	4.40E-05	8.29E-09
Application	MAX	Ruffed_grouse	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	7.05E-06	1.46E-05	0.00E+00	3.58E-07	2.82E-12	1.64E-09	2.20E-05	3.13E-05	6.47E-09
Application	MAX	Ruffed_grouse	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	1.91E-06	1.22E-05	0.00E+00	9.72E-08	4.18E-12	1.96E-08	1.42E-05	2.02E-05	4.11E-09
Application	MAX	Ruffed_grouse	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	4.73E-08	3.17E-07	0.00E+00	2.40E-09	5.41E-13	2.50E-08	3.92E-07	5.58E-07	8.45E-11
Application	MAX	Ruffed_grouse	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	1.95E-06	2.00E-05	0.00E+00	1.13E-07	8.84E-14	5.87E-10	2.21E-05	3.15E-05	4.79E-09
Application	MAX	Ruffed_grouse	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	8.67E-07	4.61E-06	0.00E+00	4.40E-08	5.62E-12	4.30E-08	5.57E-06	7.93E-06	1.39E-09
Application	MAX	Ruffed_grouse	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	3.75E-06	1.83E-06	0.00E+00	1.90E-07	9.46E-12	2.72E-09	5.77E-06	8.22E-06	1.64E-09
Application	MAX	Snowshoe_hare	Anthracene	2.40E-06	2.40E-05	5.34E-11	5.21E-05	0.00E+00	5.85E-06	2.23E-06	2.33E-07	8.20E-07	1.01E-06	2.11E-07	2.61E-06	0.00E+00	0.00E+00	7.61E-12	2.91E-08	2.85E-06	1.90E-06	9.62E-10
Application	MAX	Snowshoe_hare	Benzo(a)anthracene	3.32E-05	3.32E-04	5.53E-11	1.49E-05	0.00E+00	4.31E-04	1.12E-04	6.52E-07	8.49E-07	5.96E-06	2.91E-06	1.70E-04	0.00E+00	0.00E+00	7.88E-12	8.30E-09	1.73E-04	1.16E-04	6.92E-08
Application	MAX	Snowshoe_hare	Benzo(a)pyrene	6.60E-05	6.60E-04	4.12E-11	1.77E-05	0.00E+00	7.04E-04	5.23E-04	8.70E-07	6.33E-07	2.77E-05	5.79E-06	3.85E-04	0.00E+00	0.00E+00	5.88E-12	9.91E-09	3.91E-04	2.60E-04	1.47E-07
Application	MAX	Snowshoe_hare	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.66E-10	2.79E-04	0.00E+00	5.33E-04	3.63E-04	1.13E-06	1.48E-05	4.24E-05	8.88E-06	2.81E-04	0.00E+00	0.00E+00	1.38E-10	1.56E-07	2.90E-04	1.94E-04	1.05E-07
Application	MAX	Snowshoe_hare	Benzo(ghi) perylene	3.59E-05	3.59E-04	4.53E-10	7.07E-06	0.00E+00	3.75E-04	6.08E-03	9.20E-08	6.95E-06	1.50E-05	3.15E-06	2.02E-03	0.00E+00	0.00E+00	6.46E-11	3.95E-09	2.03E-03	1.35E-03	3.86E-07
Application	MAX	Snowshoe_hare	Benzo(k)fluoranthene	2.02E-05	2.02E-04	1.06E-11	1.65E-06	0.00E+00	6.75E-05	7.66E-05	2.33E-07	1.63E-07	9.68E-06	1.77E-06	4.52E-05	0.00E+00	0.00E+00	1.52E-12	9.23E-10	4.70E-05	3.13E-05	1.71E-08
Application	MAX	Snowshoe_hare	Chrysene	3.64E-05	3.64E-04	6.06E-11	5.27E-06	0.00E+00	7.58E-05	2.18E-06	7.15E-07	9.31E-07	1.53E-05	3.19E-06	2.47E-05	0.00E+00	0.00E+00	8.64E-12	2.95E-09	2.79E-05	1.86E-05	1.11E-08
Application	MAX	Snowshoe_hare	Fluoranthene	9.87E-06	9.87E-05	8.97E-11	6.29E-05	0.00E+00	2.83E-05	3.70E-05	4.92E-07	1.38E-06	4.14E-06	8.66E-07	2.06E-05	0.00E+00	0.00E+00	1.28E-11	3.51E-08	2.15E-05	1.43E-05	8.45E-09
Application	MAX	Snowshoe_hare	Fluorene	2.44E-07	2.44E-06	1.16E-11	8.04E-05	0.00E+00	0.00E+00	1.68E-06	3.53E-08	1.78E-07	1.02E-07	2.14E-08	5.37E-07	0.00E+00	0.00E+00	1.66E-12	4.49E-08	6.03E-07	4.02E-07	1.77E-10
Application	MAX	Snowshoe_hare	Indeno(1,2,3-cd)pyrene	1.01E-05	1.01E-04	1.90E-12	1.88E-06	0.00E+00	1.05E-04	2.83E-06	5.97E-08	2.92E-08	4.82E-06	8.84E-07	3.39E-05	0.00E+00	0.00E+00	2.71E-13	1.05E-09	3.48E-05	2.32E-05	1.02E-08
Application	MAX	Snowshoe_hare	Phenanthrene	4.47E-06	4.47E-05	1.21E-10	1.38E-04	0.00E+00	7.76E-06	1.67E-05	4.34E-07	1.86E-06	1.87E-06	3.92E-07	7.81E-06	0.00E+00	0.00E+00	1.72E-11	7.72E-08	8.28E-06	5.52E-06	2.80E-09
Application	MAX	Snowshoe_hare	Pyrene	1.93E-05	1.93E-04	2.03E-10	8.73E-06	0.00E+00	2.94E-06	5.87E-06	1.10E-06	3.12E-06	8.10E-06	1.69E-06	3.11E-06	0.00E+00	0.00E+00	2.90E-11	4.88E-09	4.81E-06	3.20E-06	1.85E-09
Base	MAX	Beef	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	8.47E-06	7.33E-05	0.00E+00	0.00E+00	1.65E-09	1.91E-06	8.36E-05	1.48E-07	2.83E-08
Base	MAX	Beef	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	5.48E-05	2.24E-03	0.00E+00	0.00E+00	8.00E-10	2.55E-07	2.30E-03	4.05E-06	9.18E-07
Base	MAX	Beef	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	1.80E-05	8.38E-04	0.00E+00	0.00E+00	9.87E-11	5.04E-08	8.56E-04	1.51E-06	3.21E-07

Table B2-1 Summary of predicted exposures and tissue concentrations for each ecological receptor, scenario, location and chemical

									Environmental Concentrations					EDI									
Case	Site	Receptor	Chemical	Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Air ug/m^3	Deposition mg/m^2/yr	Browse Deposition mg/kg dw	Browse Air mg/kg dw	Browse Soil mg/kg dw	Aquatic Plant Aquatic mg/kg dw	Invert Soil mg/kg dw	Soil EDI mg/day	Browse EDI mg/day	Aquatic Plant EDI mg/day	Invert EDI mg/day	Water EDI mg/day	Air EDI mg/day	Total EDI mg/day	Total EDI mg/kg-BW/day	Tissue Concentration mg/kg ww
Base	MAX	Beef	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	2.64E-06	5.85E-05	0.00E+00	0.00E+00	2.21E-10	7.57E-08	6.12E-05	1.08E-07	2.22E-08
Base	MAX	Beef	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	1.78E-04	8.02E-02	0.00E+00	0.00E+00	1.97E-08	3.65E-07	8.04E-02	1.42E-04	1.53E-05
Base	MAX	Beef	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	8.21E-05	1.47E-03	0.00E+00	0.00E+00	3.79E-10	6.98E-08	1.55E-03	2.73E-06	5.65E-07
Base	MAX	Beef	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	1.81E-04	9.81E-04	0.00E+00	0.00E+00	2.65E-09	2.74E-07	1.16E-03	2.05E-06	4.64E-07
Base	MAX	Beef	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	5.07E-05	8.45E-04	0.00E+00	0.00E+00	4.04E-09	3.36E-06	8.99E-04	1.59E-06	3.53E-07
Base	MAX	Beef	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	1.24E-06	2.19E-05	0.00E+00	0.00E+00	5.20E-10	4.27E-06	2.74E-05	4.83E-08	8.02E-09
Base	MAX	Beef	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	5.13E-05	1.38E-03	0.00E+00	0.00E+00	8.48E-11	9.98E-08	1.43E-03	2.52E-06	4.20E-07
Base	MAX	Beef	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	2.29E-05	3.19E-04	0.00E+00	0.00E+00	5.42E-09	7.35E-06	3.49E-04	6.15E-07	1.18E-07
Base	MAX	Beef	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	8.56E-05	1.10E-04	0.00E+00	0.00E+00	7.90E-09	4.03E-07	1.96E-04	3.45E-07	7.53E-08
Base	MAX	Chicken	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	1.15E-06	3.54E-06	0.00E+00	5.44E-08	1.16E-11	2.93E-08	4.77E-06	1.91E-06	1.19E-09
Base	MAX	Chicken	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	7.45E-06	1.08E-04	0.00E+00	1.51E-07	5.60E-12	3.92E-09	1.16E-04	4.64E-05	3.41E-08
Base	MAX	Chicken	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	2.45E-06	4.04E-05	0.00E+00	1.16E-07	6.91E-13	7.73E-10	4.30E-05	1.72E-05	1.19E-08
Base	MAX	Chicken	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	3.59E-07	2.82E-06	0.00E+00	1.70E-08	1.55E-12	1.16E-09	3.20E-06	1.28E-06	8.54E-10
Base	MAX	Chicken	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	2.42E-05	3.87E-03	0.00E+00	1.15E-06	1.38E-10	5.61E-09	3.90E-03	1.56E-03	5.47E-07
Base	MAX	Chicken	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	1.12E-05	7.08E-05	0.00E+00	6.03E-07	2.65E-12	1.07E-09	8.26E-05	3.30E-05	2.22E-08
Base	MAX	Chicken	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	2.47E-05	4.74E-05	0.00E+00	1.16E-06	1.86E-11	4.20E-09	7.32E-05	2.93E-05	2.15E-08
Base	MAX	Chicken	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	6.89E-06	4.08E-05	0.00E+00	3.26E-07	2.83E-11	5.16E-08	4.81E-05	1.92E-05	1.39E-08
Base	MAX	Chicken	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	1.69E-07	1.06E-06	0.00E+00	8.00E-09	3.64E-12	6.55E-08	1.30E-06	5.19E-07	2.80E-10
Base	MAX	Chicken	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	6.97E-06	6.65E-05	0.00E+00	3.76E-07	5.94E-13	1.53E-09	7.38E-05	2.95E-05	1.60E-08
Base	MAX	Chicken	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	3.11E-06	1.54E-05	0.00E+00	1.47E-07	3.79E-11	1.13E-07	1.88E-05	7.50E-06	4.67E-09
Base	MAX	Chicken	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	1.16E-05	5.30E-06	0.00E+00	5.50E-07	5.53E-11	6.18E-09	1.75E-05	7.00E-06	4.96E-09
Base	MAX	Dairy	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	8.47E-06	7.33E-05	0.00E+00	0.00E+00	4.95E-09	1.91E-06	8.36E-05	1.48E-07	5.95E-09
Base	MAX	Dairy	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	5.48E-05	2.24E-03	0.00E+00	0.00E+00	2.40E-09	2.55E-07	2.30E-03	4.05E-06	1.93E-07
Base	MAX	Dairy	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	1.80E-05	8.38E-04	0.00E+00	0.00E+00	2.96E-10	5.04E-08	8.56E-04	1.51E-06	6.77E-08
Base	MAX	Dairy	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	2.64E-06	5.85E-05	0.00E+00	0.00E+00	6.63E-10	7.57E-08	6.12E-05	1.08E-07	4.66E-09
Base	MAX	Dairy	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	1.78E-04	8.02E-02	0.00E+00	0.00E+00	5.92E-08	3.65E-07	8.04E-02	1.42E-04	3.22E-06
Base	MAX	Dairy	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	8.21E-05	1.47E-03	0.00E+00	0.00E+00	1.14E-09	6.98E-08	1.55E-03	2.73E-06	1.19E-07
Base	MAX	Dairy	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	1.81E-04	9.81E-04	0.00E+00	0.00E+00	7.95E-09	2.74E-07	1.16E-03	2.05E-06	9.78E-08
Base	MAX	Dairy	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	5.07E-05	8.45E-04	0.00E+00	0.00E+00	1.21E-08	3.36E-06	8.99E-04	1.59E-06	7.43E-08
Base	MAX	Dairy	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	1.24E-06	2.19E-05	0.00E+00	0.00E+00	1.56E-09	4.27E-06	2.74E-05	4.83E-08	1.69E-09
Base	MAX	Dairy	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	5.13E-05	1.38E-03	0.00E+00	0.00E+00	2.54E-10	9.98E-08	1.43E-03	2.52E-06	8.84E-08
Base	MAX	Dairy	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	2.29E-05	3.19E-04	0.00E+00	0.00E+00	1.63E-08	7.35E-06	3.49E-04	6.15E-07	2.48E-08
Base	MAX	Dairy	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	8.56E-05	1.10E-04	0.00E+00	0.00E+00	2.37E-08	4.03E-07	1.96E-04	3.45E-07	1.58E-08
Base	MAX	Eggs	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	7.51E-07	2.31E-06	0.00E+00	3.54E-08	1.16E-11	2.08E-08	3.11E-06	1.95E-06	4.43E-10
Base	MAX	Eggs	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	4.85E-06	7.06E-05	0.00E+00	9.82E-08	5.60E-12	2.78E-09	7.56E-05	4.72E-05	1.27E-08
Base	MAX	Eggs	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	1.60E-06	2.64E-05	0.00E+00	7.54E-08	6.91E-13	5.48E-10	2.80E-05	1.75E-05	4.43E-09
Base	MAX	Eggs	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	2.34E-07	1.84E-06	0.00E+00	1.11E-08	1.55E-12	8.24E-10	2.09E-06	1.30E-06	3.18E-10
Base	MAX	Eggs	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	1.58E-05	2.52E-03	0.00E+00	7.46E-07	1.38E-10	3.98E-09	2.54E-03	1.59E-03	2.04E-07
Base	MAX	Eggs	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	7.28E-06	4.61E-05	0.00E+00	3.93E-07	2.65E-12	7.60E-10	5.38E-05	3.36E-05	8.26E-09
Base	MAX	Eggs	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	1.61E-05	3.09E-05	0.00E+00	7.59E-07	1.86E-11	2.98E-09	4.77E-05	2.98E-05	8.02E-09
Base	MAX	Eggs	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	4.49E-06	2.66E-05	0.00E+00	2.12E-07	2.83E-11	3.66E-08	3.13E-05	1.96E-05	5.18E-09
Base	MAX	Eggs	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	1.10E-07	6.88E-07	0.00E+00	5.21E-09	3.64E-12	4.65E-08	8.50E-07	5.31E-07	1.05E-10
Base	MAX	Eggs	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	4.54E-06	4.33E-05	0.00E+00	2.45E-07	5.94E-13	1.09E-09	4.81E-05	3.01E-05	5.96E-09
Base	MAX	Eggs	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	2.03E-06	1.00E-05	0.00E+00	9.57E-08	3.79E-11	8.00E-08	1.22E-05	7.64E-06	1.74E-09
Base	MAX	Eggs	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	7.59E-06	3.46E-06	0.00E+00	3.58E-07	5.53E-11	4.38E-09	1.14E-05	7.13E-06	1.85E-09
Base	MAX	Moose	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	4.24E-06	5.05E-05	2.25E-06	0.00E+00	8.78E-10	1.60E-06	5.86E-05	1.30E-07	1.98E-08
Base	MAX	Moose	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	2.74E-05	1.55E-03	1.09E-06	0.00E+00	4.26E-10	2.13E-07	1.57E-03	3.50E-06	6.29E-07
Base	MAX	Moose	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	9.01E-06	5.77E-04	1.35E-07	0.00E+00	5.25E-11	4.22E-08	5.86E-04	1.30E-06	2.20E-07
Base	MAX	Moose	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	1.32E-06	4.03E-05	3.02E-07	0.00E+00	1.18E-10	6.34E-08	4.20E-05	9.33E-08	1.52E-08
Base	MAX	Moose	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	8.92E-05	5.53E-02	2.69E-05	0.00E+00	1.05E-08	3.06E-07	5.54E-02	1.23E-04	1.05E-05
Base	MAX	Moose	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	4.11E-05	1.01E-03	5.17E-07	0.00E+00	2.02E-10	5.85E-08	1.05E-03	2.34E-06	3.84E-07
Base	MAX	Moose	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	9.08E-05	6.76E-04	3.62E-06	0.00E+00	1.41E-09	2.29E-07	7.71E-04	1.71E-06	3.08E-07
Base	MAX	Moose	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	2.54E-05	5.82E-04	5.52E-06	0.00E+00	2.15E-09	2.81E-06	6.16E-04	1.37E-06	2.42E-07
Base	MAX	Moose	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	6.23E-07	1.51E-05	7.10E-07	0.00E+00	2.77E-10	3.57E-06	2.00E-05	4.44E-08	5.85E-09
Base	MAX	Moose	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	2.57E-05	9.49E-04	1.16E-07	0.00E+00	4.51E-11	8.35E-08	9.75E-04	2.17E-06	2.87E-07
Base	MAX	Moose	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	1.14E-05	2.20E-04	7.40E-06	0.00E+00	2.88E-09	6.15E-06	2.45E-04	5.44E-07	8.27E-08
Base	MAX	Moose	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	4.28E-05	7.57E-05	1.08E-05	0.00E+00	4.20E-09	3.37E-07	1.30E-04	2.88E-07	4.98E-08
Base	MAX	Ruffed_grouse	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	3.17E-07	1.05E-06	0.00E+00	1.61E-08	1.69E-12	1.10E-08	1.39E-06	1.98E-06	3.46E-10
Base	MAX	Ruffed_grouse	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	2.05E-06	3.20E-05	0.00E+00	4.46E-08	8.19E-13	1.47E-09	3.41E-05	4.86E-05	1.00E-08
Base	MAX	Ruffed_grouse	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	6.74E-07	1.20E-05	0.00E+00	3.42E-08	1.01E-13	2.91E-10	1.27E-05	1.80E-05	3.51E-09
Base	MAX	Ruffed_grouse	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	9.88E-08	8.35E-07	0.00E+00	5.02E-09	2.26E-13	4.37E-10	9.40E-07	1.34E-06	2.51E-10
Base	MAX	Ruffed_grouse	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	6.67E-06	1.15E-03	0.00E+00	3.39E-07	2.02E-11	2.11E-09	1.15E-03	1.64E-03	1.62E-07
Base	MAX	Ruffed_grouse	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	3.07E-06	2.09E-05	0.00E+00	1.78E-07	3.88E-13	4.03E-10	2.42E-05	3.45E-05	6.50E-09
Base	MAX	Ruffed_grouse	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	6.79E-06	1.40E-05	0.00E+00	3.45E-07	2.71E-12	1.58E-09	2.11E-05	3.01E-05	6.22E-09
Base	MAX	Ruffed_grouse	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	1.90E-06	1.21E-05	0.00E+00	9.63E-08	4.14E-12	1.94E-08	1.41E-05	2.01E-05	4.07E-09
Base	MAX	Ruffed_grouse	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	4.66E-08	3.12E-07	0.00E+00	2.37E-09	5.32E-13	2.46E-08	3.86E-07	5.50E-07	8.32E-11
Base	MAX	Ruffed_grouse	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	1.92E-06	1.97E-05	0.00E+00	1.11E-07	8.68E-14	5.76E-10	2.17E-05	3.09E-05	4.70E-09
Base	MAX	Ruffed_grouse	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	8.55E-07	4.55E-06	0.00E+00	4.34E-08	5.55E-12	4.24E-08	5.49E-06	7.82E-06	1.37E-09
Base	MAX	Ruffed_grouse	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	3.20E-06	1.57E-06	0.00E+00	1.63E-07	8.09E-12	2.32E-09	4.94E-06	7.03E-06	1.40E-09
Base	MAX	Snowshoe_hare	Anthracene	1.63E-06	1.63E-05	3.63E-11	3.54E-05	0.00E+00	3.98E-06	1.52E-06	1.59E-07	5.57E-07	6.85E-07	1.43E-07	1.77E-06	0.00E+00	0.00E+00	5.18E-12	1.98E-08	1.93E-06	1.29E-06	6.54E-10
Base	MAX	Snowshoe_hare	Benzo(a)anthracene	1.06E-05	1.06E-04	1.76E-11	4.73E-06	0.00E+00	1.37E-04	3.55E-05	2.08E-07	2.70E-07	1.90E-06	9.27E-07	5.43E-05	0.00E+00	0.00E+00	2.51E-12	2.64E-09	5.52E-05	3.68E-05	2.20E-08
Base	MAX	Snowshoe_hare	Benzo(a)pyrene	3.47E-06	3.47E-05	2.17E-12	9.34E-07	0.00E+00	3.70E-05	2.76E-05	4.58E-08	3.33E-08	1.46E-06	3.05E-07	2.03E-05	0.00E+00	0.00E+00	3.10E-13	5.22E-10	2.06E-05	1.37E-05	7.72E-09
Base	MAX	Snowshoe_hare	Benzo(b)fluoranthene	5.09E-07	5.09E-06	4.86E-12	1.40E-06	0.00E+00	2.68E-06	1.83E-06	5.69E-09	7.46E-08	2.14E-07	4.47E-08	1.41E-06	0.00E+00	0.00E+00	6.93E-13	7.84E-10	1.46E-06	9.74E-07	5.29E-10
Base	MAX	Snowshoe_hare	Benzo(ghi) perylene	3.44E-05	3.44E-04	4.34E-10	6.77E-06	0.00E+00	3.60E-04	5.83E-03	8.82E-08	6.66E-06	1.44E-05	3.02E-06	1.94E-03	0.00E+00	0.00E+00	6.19E-11	3.79E-09	1.94E-03	1.29E-03	3.70E-07
Base	MAX	Snowshoe_hare	Benzo(k)fluoranthene	1.58E-05	1.58E-04	8.34E-12	1.29E-06	0.00E+00	5.29E-05	6.01E-05	1.83E-07	1.28E-07	7.59E-06	1.39E-06	3.55E-05	0.00E+00	0.00E+00	1.19E-12	7.23E-10	3.69E-05	2.46E-05	1.34E-08
Base	MAX	Snowshoe_hare	Chrysene	3.50E-05	3.50E-04	5.83E-11	5.07E-06	0.00E+00	7.29E-05	2.10E-06	6.88E-07	8.95E-07	1.47E-05	3.07E-06	2.37E-05	0.00E+00	0.00E+00	8.32E-12	2.83E-09	2.68E-05	1.79E-05	1.07E-08
Base	MAX	Snowshoe_hare	Fluoranthene	9.78E-06	9.78E-05	8.89E-11	6.23E-05	0.00E+00	2.80E-05	3.67E-05	4.88E-07	1.36E-06	4.10E-06	8.58E-07	2.04E-05	0.00E+00	0.00E+00	1.27E-11	3.48E-08	2.13E-05	1.42E-05	8.37E-09
Base	MAX	Snowshoe_hare	Fluorene	2.40E-07	2.40E-06	1.14E-11	7.91E-05	0.00E+00	0.00E+00	1.65E-06	3.47E-08	1.76E-07	1.01E-07	2.11E-08	5.29E-07	0.00E+00	0.00E+00	1.63E-12	4.42E-08	5.94E-07	3.96E-07	1.74E-10
Base	MAX	Snowshoe_hare	Indeno(1,2,3-cd)pyrene	9.89E-06	9.89E-05	1.87E-12	1.85E-06	0.00E+00	1.03E-04	2.78E-06	5.87E-08	2.86E-08	4.74E-06	8.68E-07	3.33E-05	0.00E+00	0.00E+00	2.66E-13	1.03E-09	3.42E-05	2.28E-05	1.00E-08
Base	MAX	Snowshoe_hare	Phenanthrene	4.41E-06	4.41E-05	1.19E-10	1.36E-04	0.00E+00	7.66E-06	1.65E-05	4.28E-07	1.83E-06	1.85E-06	3.87E-07	7.71E-06	0.00E+00	0.00E+00	1.70E-11	7.61E-08	8.17E-06	5.45E-06	2.76E-09
Base	MAX	Snowshoe_hare	Pyrene	1.65E-05	1.65E-04	1.74E-10	7.47E-06	0.00E+00	2.52E-06	5.02E-06	9.41E-07	2.67E-06	6.92E-06	1.45E-06	2.66E-06	0.00E+00	0.00E+00	2.48E-11	4.17E-09	4.11E-06	2.74E-06	1.58E-09
CEA	MAX	Beef	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	1.71E-05	1.48E-04	0.00E+00	0.00E+00	3.33E-09	3.85E-06	1.69E-04	2.98E-07	5.70E-08
CEA	MAX	Beef	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	1.88E-04	7.70E-03	0.00E+00	0.00E+00	2.75E-09	8.76E-07	7.89E-03	1.39E-05	3.15E-06
CEA	MAX	Beef	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	3.55E-04	1.65E-02	0.00E+00	0.00E+00	1.95E-09	9.93E-07	1.69E-02	2.97E-05	6.34E-06
CEA	MAX	Beef	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	5.26E-04	1.17E-02	0.00E+00	0.00E+00	4.40E-08	1.51E-05	1.22E-02	2.15E-05	4.42E-06
CEA	MAX	Beef	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	2.15E-04	9.67E-02	0.00E+00	0.00E+00	2.38E-08	4.41E-07	9.69E-02	1.71E-04	1.85E-05
CEA	MAX	Beef	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	1.75E-04	3.12E-03	0.00E+00	0.00E+00	8.06E-10	1.49E-07	3.29E-03	5.81E-06	1.20E-06

Table B2-1 Summary of predicted exposures and tissue concentrations for each ecological receptor, scenario, location and chemical

									Environmental Concentrations					EDI								
Case	Site	Receptor	Chemical	Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Air ug/m^3	Deposition mg/m^2/yr	Browse Deposition mg/kg dw	Browse Air mg/kg dw	Browse Soil mg/kg dw	Aquatic Plant Aquatic mg/kg dw	Invert Soil mg/kg dw	Soil EDI mg/day	Browse EDI mg/day	Aquatic Plant EDI mg/day	Invert EDI mg/day	Water EDI mg/day	Air EDI mg/day	Total EDI mg/day	Total EDI mg/kg-BW/day	Tissue Concentration mg/kg ww
CEA	MAX	Beef	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	3.24E-04	1.75E-03	0.00E+00	0.00E+00	4.74E-09	4.89E-07	2.08E-03	3.67E-06	8.30E-07
CEA	MAX	Beef	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	8.61E-05	1.44E-03	0.00E+00	0.00E+00	6.86E-09	5.71E-06	1.53E-03	2.69E-06	5.99E-07
CEA	MAX	Beef	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	2.11E-06	3.72E-05	0.00E+00	0.00E+00	8.83E-10	7.25E-06	4.65E-05	8.20E-08	1.36E-08
CEA	MAX	Beef	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	8.31E-05	2.23E-03	0.00E+00	0.00E+00	1.38E-10	1.62E-07	2.32E-03	4.09E-06	6.81E-07
CEA	MAX	Beef	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	3.62E-05	5.04E-04	0.00E+00	0.00E+00	8.58E-09	1.16E-05	5.52E-04	9.74E-07	1.87E-07
CEA	MAX	Beef	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	1.14E-04	1.46E-04	0.00E+00	0.00E+00	1.05E-08	5.35E-07	2.60E-04	4.59E-07	1.00E-07
CEA	MAX	Chicken	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	2.32E-06	7.13E-06	0.00E+00	1.10E-07	2.33E-11	5.91E-08	9.62E-06	3.85E-06	2.40E-09
CEA	MAX	Chicken	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	2.56E-05	3.72E-04	0.00E+00	5.18E-07	1.92E-11	1.34E-08	3.98E-04	1.59E-04	1.17E-07
CEA	MAX	Chicken	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	4.83E-05	7.97E-04	0.00E+00	2.28E-06	1.36E-11	1.52E-08	8.48E-04	3.39E-04	2.35E-07
CEA	MAX	Chicken	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	7.15E-05	5.63E-04	0.00E+00	3.38E-06	3.08E-10	2.32E-07	6.38E-04	2.55E-04	1.70E-07
CEA	MAX	Chicken	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	2.92E-05	4.67E-03	0.00E+00	1.38E-06	1.67E-10	6.76E-09	4.70E-03	1.88E-03	6.59E-07
CEA	MAX	Chicken	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	2.38E-05	1.51E-04	0.00E+00	1.28E-06	5.64E-12	2.28E-09	1.76E-04	7.03E-05	4.72E-08
CEA	MAX	Chicken	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	4.41E-05	8.47E-05	0.00E+00	2.08E-06	3.32E-11	7.50E-09	1.31E-04	5.23E-05	3.85E-08
CEA	MAX	Chicken	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	1.17E-05	6.93E-05	0.00E+00	5.53E-07	4.80E-11	8.76E-08	8.16E-05	3.27E-05	2.36E-08
CEA	MAX	Chicken	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	2.88E-07	1.79E-06	0.00E+00	1.36E-08	6.18E-12	1.11E-07	2.21E-06	8.82E-07	4.76E-10
CEA	MAX	Chicken	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	1.13E-05	1.08E-04	0.00E+00	6.10E-07	9.63E-13	2.48E-09	1.20E-04	4.79E-05	2.59E-08
CEA	MAX	Chicken	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	4.92E-06	2.43E-05	0.00E+00	2.32E-07	6.00E-11	1.79E-07	2.97E-05	1.19E-05	7.39E-09
CEA	MAX	Chicken	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	1.55E-05	7.05E-06	0.00E+00	7.31E-07	7.35E-11	8.22E-09	2.33E-05	9.31E-06	6.59E-09
CEA	MAX	Dairy	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	1.71E-05	1.48E-04	0.00E+00	0.00E+00	9.98E-09	3.85E-06	1.69E-04	2.98E-07	1.20E-08
CEA	MAX	Dairy	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	1.88E-04	7.70E-03	0.00E+00	0.00E+00	8.24E-09	8.76E-07	7.89E-03	1.39E-05	6.63E-07
CEA	MAX	Dairy	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	3.55E-04	1.65E-02	0.00E+00	0.00E+00	5.84E-09	9.93E-07	1.69E-02	2.97E-05	1.33E-06
CEA	MAX	Dairy	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	5.26E-04	1.17E-02	0.00E+00	0.00E+00	1.32E-07	1.51E-05	1.22E-02	2.15E-05	9.30E-07
CEA	MAX	Dairy	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	2.15E-04	9.67E-02	0.00E+00	0.00E+00	7.14E-08	4.41E-07	9.69E-02	1.71E-04	3.89E-06
CEA	MAX	Dairy	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	1.75E-04	3.12E-03	0.00E+00	0.00E+00	2.42E-09	1.49E-07	3.29E-03	5.81E-06	2.53E-07
CEA	MAX	Dairy	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	3.24E-04	1.75E-03	0.00E+00	0.00E+00	1.42E-08	4.89E-07	2.08E-03	3.67E-06	1.75E-07
CEA	MAX	Dairy	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	8.61E-05	1.44E-03	0.00E+00	0.00E+00	2.06E-08	5.71E-06	1.53E-03	2.69E-06	1.26E-07
CEA	MAX	Dairy	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	2.11E-06	3.72E-05	0.00E+00	0.00E+00	2.65E-09	7.25E-06	4.65E-05	8.21E-08	2.87E-09
CEA	MAX	Dairy	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	8.31E-05	2.23E-03	0.00E+00	0.00E+00	4.13E-10	1.62E-07	2.32E-03	4.09E-06	1.43E-07
CEA	MAX	Dairy	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	3.62E-05	5.04E-04	0.00E+00	0.00E+00	2.57E-08	1.16E-05	5.52E-04	9.74E-07	3.93E-08
CEA	MAX	Dairy	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	1.14E-04	1.46E-04	0.00E+00	0.00E+00	3.15E-08	5.35E-07	2.60E-04	4.59E-07	2.11E-08
CEA	MAX	Eggs	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	1.51E-06	4.65E-06	0.00E+00	7.15E-08	2.33E-11	4.19E-08	6.28E-06	3.92E-06	8.93E-10
CEA	MAX	Eggs	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	1.67E-05	2.42E-04	0.00E+00	3.37E-07	1.92E-11	9.54E-09	2.59E-04	1.62E-04	4.36E-08
CEA	MAX	Eggs	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	3.15E-05	5.20E-04	0.00E+00	1.49E-06	1.36E-11	1.08E-08	5.53E-04	3.45E-04	8.74E-08
CEA	MAX	Eggs	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	4.66E-05	3.67E-04	0.00E+00	2.20E-06	3.08E-10	1.64E-07	4.16E-04	2.60E-04	6.34E-08
CEA	MAX	Eggs	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	1.91E-05	3.04E-03	0.00E+00	9.00E-07	1.67E-10	4.80E-09	3.06E-03	1.91E-03	2.46E-07
CEA	MAX	Eggs	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	1.55E-05	9.82E-05	0.00E+00	8.36E-07	5.64E-12	1.62E-09	1.14E-04	7.15E-05	1.76E-08
CEA	MAX	Eggs	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	2.87E-05	5.52E-05	0.00E+00	1.36E-06	3.32E-11	5.32E-09	8.53E-05	5.33E-05	1.43E-08
CEA	MAX	Eggs	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	7.63E-06	4.52E-05	0.00E+00	3.60E-07	4.80E-11	6.21E-08	5.32E-05	3.33E-05	8.79E-09
CEA	MAX	Eggs	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	1.87E-07	1.17E-06	0.00E+00	8.85E-09	6.18E-12	7.90E-08	1.44E-06	9.03E-07	1.78E-10
CEA	MAX	Eggs	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	7.37E-06	7.03E-05	0.00E+00	3.98E-07	9.63E-13	1.76E-09	7.81E-05	4.88E-05	9.66E-09
CEA	MAX	Eggs	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	3.21E-06	1.59E-05	0.00E+00	1.51E-07	6.00E-11	1.27E-07	1.94E-05	1.21E-05	2.76E-09
CEA	MAX	Eggs	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	1.01E-05	4.60E-06	0.00E+00	4.76E-07	7.35E-11	5.83E-09	1.52E-05	9.48E-06	2.45E-09
CEA	MAX	Moose	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	8.55E-06	1.02E-04	4.54E-06	0.00E+00	1.77E-09	3.22E-06	1.18E-04	2.63E-07	3.99E-08
CEA	MAX	Moose	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	8.55E-06	1.02E-04	4.54E-06	0.00E+00	1.77E-09	3.22E-06	1.18E-04	2.63E-07	3.99E-08
CEA	MAX	Moose	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	9.41E-05	5.31E-03	3.75E-06	0.00E+00	1.46E-09	7.33E-07	5.41E-03	1.20E-05	2.16E-06
CEA	MAX	Moose	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	1.78E-04	1.14E-02	2.66E-06	0.00E+00	1.04E-09	8.31E-07	1.16E-02	2.57E-05	4.34E-06
CEA	MAX	Moose	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	2.63E-04	8.03E-03	6.01E-05	0.00E+00	2.34E-08	1.26E-05	8.37E-03	1.86E-05	3.03E-06
CEA	MAX	Moose	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	1.08E-04	6.66E-02	3.25E-05	0.00E+00	1.27E-08	3.69E-07	6.68E-02	1.48E-04	1.27E-05
CEA	MAX	Moose	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	8.74E-05	2.15E-03	1.10E-06	0.00E+00	4.29E-10	1.24E-07	2.24E-03	4.97E-06	8.16E-07
CEA	MAX	Moose	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	1.62E-04	1.21E-03	6.47E-06	0.00E+00	2.52E-09	4.09E-07	1.38E-03	3.06E-06	5.50E-07
CEA	MAX	Moose	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	4.31E-05	9.89E-04	9.37E-06	0.00E+00	3.65E-09	4.78E-06	1.05E-03	2.32E-06	4.11E-07
CEA	MAX	Moose	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	1.06E-06	2.56E-05	1.21E-06	0.00E+00	4.70E-10	6.07E-06	3.39E-05	7.54E-08	9.93E-09
CEA	MAX	Moose	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	4.16E-05	1.54E-03	1.88E-07	0.00E+00	7.32E-11	1.35E-07	1.58E-03	3.51E-06	4.65E-07
CEA	MAX	Moose	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	1.81E-05	3.48E-04	1.17E-05	0.00E+00	4.56E-09	9.73E-06	3.87E-04	8.60E-07	1.31E-07
CEA	MAX	Moose	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	5.69E-05	1.01E-04	1.43E-05	0.00E+00	5.59E-09	4.48E-07	1.72E-04	3.83E-07	6.63E-08
CEA	MAX	Ruffed_grouse	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	6.39E-07	2.11E-06	0.00E+00	3.24E-08	3.41E-12	2.22E-08	2.80E-06	3.99E-06	6.98E-10
CEA	MAX	Ruffed_grouse	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	7.03E-06	1.10E-04	0.00E+00	1.53E-07	2.81E-12	5.06E-09	1.17E-04	1.67E-04	3.45E-08
CEA	MAX	Ruffed_grouse	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	1.33E-05	2.36E-04	0.00E+00	6.74E-07	1.99E-12	5.73E-09	2.50E-04	3.56E-04	6.91E-08
CEA	MAX	Ruffed_grouse	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	1.97E-05	1.66E-04	0.00E+00	9.99E-07	4.51E-11	8.71E-08	1.87E-04	2.67E-04	4.99E-08
CEA	MAX	Ruffed_grouse	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	8.04E-06	1.38E-03	0.00E+00	4.09E-07	2.44E-11	2.54E-09	1.39E-03	1.98E-03	1.95E-07
CEA	MAX	Ruffed_grouse	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	6.53E-06	4.45E-05	0.00E+00	3.79E-07	8.25E-13	8.58E-10	5.15E-05	7.33E-05	1.38E-08
CEA	MAX	Ruffed_grouse	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	1.21E-05	2.50E-05	0.00E+00	6.16E-07	4.85E-12	2.82E-09	3.78E-05	5.38E-05	1.11E-08
CEA	MAX	Ruffed_grouse	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	3.22E-06	2.05E-05	0.00E+00	1.64E-07	7.03E-12	3.29E-08	2.39E-05	3.41E-05	6.91E-09
CEA	MAX	Ruffed_grouse	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	7.91E-08	5.31E-07	0.00E+00	4.02E-09	9.04E-13	4.19E-08	6.56E-07	9.34E-07	1.41E-10
CEA	MAX	Ruffed_grouse	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	3.11E-06	3.19E-05	0.00E+00	1.81E-07	1.41E-13	9.34E-10	3.52E-05	5.01E-05	7.62E-09
CEA	MAX	Ruffed_grouse	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	1.35E-06	7.20E-06	0.00E+00	6.87E-08	8.78E-12	6.71E-08	8.69E-06	1.24E-05	2.17E-09
CEA	MAX	Ruffed_grouse	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	4.26E-06	2.09E-06	0.00E+00	2.16E-07	1.08E-11	3.09E-09	6.56E-06	9.35E-06	1.86E-09
CEA	MAX	Snowshoe_hare	Anthracene	3.29E-06	3.29E-05	7.32E-11	7.14E-05	0.00E+00	8.02E-06	3.06E-06	3.20E-07	1.12E-06	1.38E-06	2.89E-07	3.57E-06	0.00E+00	0.00E+00	1.04E-11	3.99E-08	3.90E-06	2.60E-06	1.32E-09
CEA	MAX	Snowshoe_hare	Benzo(a)anthracene	3.63E-05	3.63E-04	6.04E-11	1.62E-05	0.00E+00	4.72E-04	1.22E-04	7.13E-07	9.28E-07	6.52E-06	3.18E-06	1.86E-04	0.00E+00	0.00E+00	8.62E-12	9.07E-09	1.89E-04	1.26E-04	7.57E-08
CEA	MAX	Snowshoe_hare	Benzo(a)pyrene	6.85E-05	6.85E-04	4.28E-11	1.84E-05	0.00E+00	7.30E-04	5.43E-04	9.03E-07	6.57E-07	2.87E-05	6.01E-06	3.99E-04	0.00E+00	0.00E+00	6.10E-12	1.03E-08	4.05E-04	2.70E-04	1.52E-07
CEA	MAX	Snowshoe_hare	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.69E-10	2.80E-04	0.00E+00	5.34E-04	3.64E-04	1.13E-06	1.49E-05	4.25E-05	8.90E-06	2.82E-04	0.00E+00	0.00E+00	1.38E-10	1.56E-07	2.91E-04	1.94E-04	1.05E-07
CEA	MAX	Snowshoe_hare	Benzo(ghi) perylene	4.15E-05	4.15E-04	5.23E-10	8.17E-06	0.00E+00	4.34E-04	7.03E-03	1.06E-07	8.04E-06	1.74E-05	3.64E-06	2.34E-03	0.00E+00	0.00E+00	7.46E-11	4.56E-09	2.34E-03	1.56E-03	4.46E-07
CEA	MAX	Snowshoe_hare	Benzo(k)fluoranthene	3.37E-05	3.37E-04	1.77E-11	2.75E-06	0.00E+00	1.13E-04	1.28E-04	3.89E-07	2.72E-07	1.61E-05	2.96E-06	7.54E-05	0.00E+00	0.00E+00	2.53E-12	1.54E-09	7.84E-05	5.23E-05	2.86E-08
CEA	MAX	Snowshoe_hare	Chrysene	6.25E-05	6.25E-04	1.04E-10	9.06E-06	0.00E+00	1.30E-04	3.76E-06	1.23E-06	1.60E-06	2.62E-05	5.49E-06	4.24E-05	0.00E+00	0.00E+00	1.49E-11	5.06E-09	4.79E-05	3.19E-05	1.91E-08
CEA	MAX	Snowshoe_hare	Fluoranthene	1.66E-05	1.66E-04	1.51E-10	1.06E-04	0.00E+00	4.76E-05	6.24E-05	8.29E-07	2.32E-06	6.96E-06	1.46E-06	3.47E-05	0.00E+00	0.00E+00	2.15E-11	5.91E-08	3.62E-05	2.42E-05	1.42E-08
CEA	MAX	Snowshoe_hare	Fluorene	4.08E-07	4.08E-06	1.94E-11	1.34E-04	0.00E+00	0.00E+00	2.81E-06	5.90E-08	2.98E-07	1.71E-07	3.58E-08	8.99E-07	0.00E+00	0.00E+00	2.77E-12	7.51E-08	1.01E-06	6.73E-07	2.95E-10
CEA	MAX	Snowshoe_hare	Indeno(1,2,3-cd)pyrene	1.60E-05	1.60E-04	3.03E-12	3.00E-06	0.00E+00	1.68E-04	4.51E-06	9.51E-08	4.65E-08	7.68E-06	1.41E-06	5.40E-05	0.00E+00	0.00E+00	4.31E-13	1.68E-09	5.54E-05	3.70E-05	1.63E-08
CEA	MAX	Snowshoe_hare	Phenanthrene	6.98E-06	6.98E-05	1.89E-10	2.16E-04	0.00E+00	1.21E-05	2.61E-05	6.77E-07	2.90E-06	2.93E-06	6.12E-07	1.22E-05	0.00E+00	0.00E+00	2.69E-11	1.20E-07	1.29E-05	8.62E-06	4.37E-09
CEA	MAX	Snowshoe_hare	Pyrene	2.20E-05	2.20E-04	2.31E-10	9.93E-06	0.00E+00	3.35E-06	6.67E-06	1.25E-06	3.55E-06	9.20E-06	1.93E-06	3.53E-06	0.00E+00	0.00E+00	3.29E-11	5.55E-09	5.46E-06	3.64E-06	2.10E-09
Project	MAX	Beef	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	2.43E-06	2.10E-05	0.00E+00	0.00E+00	4.74E-10	5.48E-07	2.40E-05	4.24E-08	8.12E-09
Project	MAX	Beef	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	1.18E-04	4.82E-03	0.00E+00	0.00E+00	1.72E-09	5.48E-07	4.94E-03	8.72E-06	1.97E-06
Project	MAX	Beef	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	3.25E-04	1.51E-02	0.00E+00	0.00E+00	1.78E-09	9.10E-07	1.55E-02	2.73E-05	5.81E-06
Project	MAX	Beef	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	5.22E-04	1.16E-02	0.00E+00	0.00E+00	4.37E-08	1.50E-05	1.21E-02	2.14E-05	4.38E-06
Project	MAX	Beef	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	7.68E-06	3.45E-03	0.00E+00	0.00E+00	8.50E-10	1.57E-08	3.46E-03	6.10E-06	6.59E-07
Project	MAX	Beef	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	2.26E-05	4.04E-04	0.00E+00	0.00E+00	1.04E-10	1.92E-08	4.27E-04	7.52E-07	1.56E-07
Project	MAX	Beef	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	8.13E-06	4.40E-05	0.00E+00	0.00E+00	1.19E-10	1.23E-08	5.22E-05	9.20E-08	2.08E-08
Project	MAX	Beef	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	5.91E-07	9.85E-06	0.00E+00	0.00E+00	4.71E-11	3.92E-08	1.05E-05	1.85E-08	4.11E-09

Table B2-1 Summary of predicted exposures and tissue concentrations for each ecological receptor, scenario, location and chemical

									Environmental Concentrations					EDI								
Case	Site	Receptor	Chemical	Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Air ug/m^3	Deposition mg/m^2/yr	Browse Deposition mg/kg dw	Browse Air mg/kg dw	Browse Soil mg/kg dw	Aquatic Plant Aquatic mg/kg dw	Invert Soil mg/kg dw	Soil EDI mg/day	Browse EDI mg/day	Aquatic Plant EDI mg/day	Invert EDI mg/day	Water EDI mg/day	Air EDI mg/day	Total EDI mg/day	Total EDI mg/kg-BW/day	Tissue Concentration mg/kg ww
Project	MAX	Beef	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	2.49E-08	4.38E-07	0.00E+00	0.00E+00	1.04E-11	8.56E-08	5.49E-07	9.68E-10	1.61E-10
Project	MAX	Beef	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	9.35E-07	2.51E-05	0.00E+00	0.00E+00	1.55E-12	1.82E-09	2.61E-05	4.60E-08	7.66E-09
Project	MAX	Beef	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	3.10E-07	4.32E-06	0.00E+00	0.00E+00	7.35E-11	9.96E-08	4.73E-06	8.34E-09	1.60E-09
Project	MAX	Beef	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	1.45E-05	1.86E-05	0.00E+00	0.00E+00	1.34E-09	6.84E-08	3.32E-05	5.86E-08	1.28E-08
Project	MAX	Chicken	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	3.31E-07	1.02E-06	0.00E+00	1.56E-08	3.32E-12	8.42E-09	1.37E-06	5.48E-07	3.41E-10
Project	MAX	Chicken	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	1.60E-05	2.33E-04	0.00E+00	3.24E-07	1.20E-11	8.42E-09	2.49E-04	9.97E-05	7.33E-08
Project	MAX	Chicken	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	4.43E-05	7.31E-04	0.00E+00	2.09E-06	1.25E-11	1.40E-08	7.77E-04	3.11E-04	2.15E-07
Project	MAX	Chicken	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	7.10E-05	5.59E-04	0.00E+00	3.35E-06	3.06E-10	2.30E-07	6.33E-04	2.53E-04	1.69E-07
Project	MAX	Chicken	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	1.04E-06	1.67E-04	0.00E+00	4.93E-08	5.95E-12	2.42E-10	1.68E-04	6.71E-05	2.35E-08
Project	MAX	Chicken	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	3.08E-06	1.95E-05	0.00E+00	1.66E-07	7.31E-13	2.95E-10	2.27E-05	9.10E-06	6.11E-09
Project	MAX	Chicken	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	1.11E-06	2.12E-06	0.00E+00	5.22E-08	8.32E-13	1.88E-10	3.28E-06	1.31E-06	9.66E-10
Project	MAX	Chicken	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	8.03E-08	4.75E-07	0.00E+00	3.79E-09	3.30E-13	6.01E-10	5.60E-07	2.24E-07	1.62E-10
Project	MAX	Chicken	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	3.39E-09	2.12E-08	0.00E+00	1.60E-10	7.29E-14	1.31E-09	2.60E-08	1.04E-08	5.61E-12
Project	MAX	Chicken	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	1.27E-07	1.21E-06	0.00E+00	6.86E-09	1.08E-14	2.79E-11	1.35E-06	5.39E-07	2.92E-10
Project	MAX	Chicken	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	4.22E-08	2.09E-07	0.00E+00	1.99E-09	5.14E-13	1.53E-09	2.54E-07	1.02E-07	6.33E-11
Project	MAX	Chicken	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	1.98E-06	9.00E-07	0.00E+00	9.33E-08	9.39E-12	1.05E-09	2.97E-06	1.19E-06	8.41E-10
Project	MAX	Dairy	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	2.43E-06	2.10E-05	0.00E+00	0.00E+00	1.42E-09	5.48E-07	2.40E-05	4.24E-08	1.71E-09
Project	MAX	Dairy	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	1.18E-04	4.82E-03	0.00E+00	0.00E+00	5.16E-09	5.48E-07	4.94E-03	8.72E-06	4.15E-07
Project	MAX	Dairy	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	3.25E-04	1.51E-02	0.00E+00	0.00E+00	5.35E-09	9.10E-07	1.55E-02	2.73E-05	1.22E-06
Project	MAX	Dairy	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	5.22E-04	1.16E-02	0.00E+00	0.00E+00	1.31E-07	1.50E-05	1.21E-02	2.14E-05	9.23E-07
Project	MAX	Dairy	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	7.68E-06	3.45E-03	0.00E+00	0.00E+00	2.55E-09	1.57E-08	3.46E-03	6.10E-06	1.39E-07
Project	MAX	Dairy	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	2.26E-05	4.04E-04	0.00E+00	0.00E+00	3.13E-10	1.92E-08	4.27E-04	7.52E-07	3.28E-08
Project	MAX	Dairy	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	8.13E-06	4.40E-05	0.00E+00	0.00E+00	3.57E-10	1.23E-08	5.22E-05	9.20E-08	4.38E-09
Project	MAX	Dairy	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	5.91E-07	9.85E-06	0.00E+00	0.00E+00	1.41E-10	3.92E-08	1.05E-05	1.85E-08	8.65E-10
Project	MAX	Dairy	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	2.49E-08	4.38E-07	0.00E+00	0.00E+00	3.13E-11	8.56E-08	5.49E-07	9.68E-10	3.38E-11
Project	MAX	Dairy	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	9.35E-07	2.51E-05	0.00E+00	0.00E+00	4.64E-12	1.82E-09	2.61E-05	4.60E-08	1.61E-09
Project	MAX	Dairy	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	3.10E-07	4.32E-06	0.00E+00	0.00E+00	2.20E-10	9.96E-08	4.73E-06	8.34E-09	3.37E-10
Project	MAX	Dairy	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	1.45E-05	1.86E-05	0.00E+00	0.00E+00	4.02E-09	6.84E-08	3.33E-05	5.86E-08	2.69E-09
Project	MAX	Eggs	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	2.16E-07	6.62E-07	0.00E+00	1.02E-08	3.32E-12	5.97E-09	8.94E-07	5.59E-07	1.27E-10
Project	MAX	Eggs	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	1.04E-05	1.52E-04	0.00E+00	2.11E-07	1.20E-11	5.97E-09	1.62E-04	1.02E-04	2.73E-08
Project	MAX	Eggs	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	2.89E-05	4.76E-04	0.00E+00	1.36E-06	1.25E-11	9.91E-09	5.07E-04	3.17E-04	8.01E-08
Project	MAX	Eggs	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	4.63E-05	3.64E-04	0.00E+00	2.19E-06	3.06E-10	1.63E-07	4.13E-04	2.58E-04	6.29E-08
Project	MAX	Eggs	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	6.81E-07	1.09E-04	0.00E+00	3.21E-08	5.95E-12	1.71E-10	1.09E-04	6.84E-05	8.77E-09
Project	MAX	Eggs	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	2.00E-06	1.27E-05	0.00E+00	1.08E-07	7.31E-13	2.09E-10	1.48E-05	9.26E-06	2.28E-09
Project	MAX	Eggs	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	7.21E-07	1.38E-06	0.00E+00	3.40E-08	8.32E-13	1.34E-10	2.14E-06	1.34E-06	3.60E-10
Project	MAX	Eggs	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	5.24E-08	3.10E-07	0.00E+00	2.47E-09	3.30E-13	4.26E-10	3.65E-07	2.28E-07	6.03E-11
Project	MAX	Eggs	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	2.21E-09	1.38E-08	0.00E+00	1.04E-10	7.29E-14	9.31E-10	1.70E-08	1.06E-08	2.10E-12
Project	MAX	Eggs	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	8.29E-08	7.91E-07	0.00E+00	4.47E-09	1.08E-14	1.98E-11	8.78E-07	5.49E-07	1.09E-10
Project	MAX	Eggs	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	2.75E-08	1.36E-07	0.00E+00	1.30E-09	5.14E-13	1.08E-09	1.66E-07	1.04E-07	2.36E-11
Project	MAX	Eggs	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	1.29E-06	5.87E-07	0.00E+00	6.08E-08	9.39E-12	7.44E-10	1.94E-06	1.21E-06	3.13E-10
Project	MAX	Moose	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	1.22E-06	1.45E-05	6.47E-07	0.00E+00	2.52E-10	4.59E-07	1.68E-05	3.74E-08	5.69E-09
Project	MAX	Moose	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	5.89E-05	3.32E-03	2.35E-06	0.00E+00	9.15E-10	4.59E-07	3.39E-03	7.52E-06	1.35E-06
Project	MAX	Moose	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	1.63E-04	1.04E-02	2.44E-06	0.00E+00	9.49E-10	7.62E-07	1.06E-02	2.35E-05	3.98E-06
Project	MAX	Moose	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	2.61E-04	7.98E-03	5.97E-05	0.00E+00	2.33E-08	1.25E-05	8.31E-03	1.85E-05	3.01E-06
Project	MAX	Moose	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	3.84E-06	2.38E-03	1.16E-06	0.00E+00	4.52E-10	1.32E-08	2.38E-03	5.30E-06	4.54E-07
Project	MAX	Moose	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	1.13E-05	2.78E-04	1.42E-07	0.00E+00	5.55E-11	1.61E-08	2.90E-04	6.44E-07	1.06E-07
Project	MAX	Moose	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	4.07E-06	3.03E-05	1.62E-07	0.00E+00	6.32E-11	1.03E-08	3.46E-05	7.68E-08	1.38E-08
Project	MAX	Moose	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	2.96E-07	6.78E-06	6.43E-08	0.00E+00	2.51E-11	3.28E-08	7.18E-06	1.59E-08	2.82E-09
Project	MAX	Moose	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	1.25E-08	3.02E-07	1.42E-08	0.00E+00	5.54E-12	7.16E-08	4.00E-07	8.90E-10	1.17E-10
Project	MAX	Moose	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	4.68E-07	1.73E-05	2.11E-09	0.00E+00	8.23E-13	1.52E-09	1.78E-05	3.95E-08	5.23E-09
Project	MAX	Moose	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	1.55E-07	2.98E-06	1.00E-07	0.00E+00	3.91E-11	8.34E-08	3.32E-06	7.37E-09	1.12E-09
Project	MAX	Moose	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	7.27E-06	1.29E-05	1.83E-06	0.00E+00	7.14E-10	5.72E-08	2.20E-05	4.89E-08	8.46E-09
Project	MAX	Ruffed_grouse	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	9.10E-08	3.00E-07	0.00E+00	4.62E-09	4.85E-13	3.17E-09	3.99E-07	5.69E-07	9.94E-11
Project	MAX	Ruffed_grouse	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	4.40E-06	6.89E-05	0.00E+00	9.59E-08	1.76E-12	3.17E-09	7.34E-05	1.05E-04	2.16E-08
Project	MAX	Ruffed_grouse	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	1.22E-05	2.16E-04	0.00E+00	6.18E-07	1.83E-12	5.25E-09	2.29E-04	3.26E-04	6.34E-08
Project	MAX	Ruffed_grouse	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	1.95E-05	1.65E-04	0.00E+00	9.92E-07	4.48E-11	8.65E-08	1.86E-04	2.65E-04	4.96E-08
Project	MAX	Ruffed_grouse	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	2.87E-07	4.93E-05	0.00E+00	1.46E-08	8.70E-13	9.08E-11	4.96E-05	7.07E-05	6.96E-09
Project	MAX	Ruffed_grouse	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	8.46E-07	5.77E-06	0.00E+00	4.91E-08	1.07E-13	1.11E-10	6.66E-06	9.49E-06	1.79E-09
Project	MAX	Ruffed_grouse	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	3.04E-07	6.28E-07	0.00E+00	1.55E-08	1.22E-13	7.08E-11	9.48E-07	1.35E-06	2.79E-10
Project	MAX	Ruffed_grouse	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	2.21E-08	1.41E-07	0.00E+00	1.12E-09	4.82E-14	2.26E-10	1.64E-07	2.34E-07	4.74E-11
Project	MAX	Ruffed_grouse	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	9.33E-10	6.26E-09	0.00E+00	4.74E-11	1.07E-14	4.94E-10	7.73E-09	1.10E-08	1.67E-12
Project	MAX	Ruffed_grouse	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	3.50E-08	3.59E-07	0.00E+00	2.03E-09	1.58E-15	1.05E-11	3.96E-07	5.64E-07	8.57E-11
Project	MAX	Ruffed_grouse	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	1.16E-08	6.17E-08	0.00E+00	5.89E-10	7.52E-14	5.75E-10	7.45E-08	1.06E-07	1.85E-11
Project	MAX	Ruffed_grouse	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	5.44E-07	2.66E-07	0.00E+00	2.76E-08	1.37E-12	3.95E-10	8.38E-07	1.19E-06	2.37E-10
Project	MAX	Snowshoe_hare	Anthracene	4.69E-07	4.69E-06	1.04E-11	1.02E-05	0.00E+00	1.14E-06	4.35E-07	4.55E-08	1.60E-07	1.97E-07	4.12E-08	5.09E-07	0.00E+00	0.00E+00	1.49E-12	5.68E-09	5.56E-07	3.70E-07	1.88E-10
Project	MAX	Snowshoe_hare	Benzo(a)anthracene	2.27E-05	2.27E-04	3.78E-11	1.02E-05	0.00E+00	2.95E-04	7.64E-05	4.46E-07	5.81E-07	4.08E-06	1.99E-06	1.17E-04	0.00E+00	0.00E+00	5.40E-12	5.68E-09	1.19E-04	7.91E-05	4.74E-08
Project	MAX	Snowshoe_hare	Benzo(a)pyrene	6.28E-05	6.28E-04	3.92E-11	1.69E-05	0.00E+00	6.69E-04	4.98E-04	8.28E-07	6.02E-07	2.63E-05	5.51E-06	3.66E-04	0.00E+00	0.00E+00	5.60E-12	9.43E-09	3.72E-04	2.48E-04	1.40E-07
Project	MAX	Snowshoe_hare	Benzo(b)fluoranthene	1.01E-04	1.01E-03	9.62E-10	2.78E-04	0.00E+00	5.31E-04	3.62E-04	1.13E-06	1.48E-05	4.22E-05	8.84E-06	2.80E-04	0.00E+00	0.00E+00	1.37E-10	1.55E-07	2.89E-04	1.93E-04	1.05E-07
Project	MAX	Snowshoe_hare	Benzo(ghi) perylene	1.48E-06	1.48E-05	1.87E-11	2.92E-07	0.00E+00	1.55E-05	2.51E-04	3.80E-09	2.87E-07	6.21E-07	1.30E-07	8.35E-05	0.00E+00	0.00E+00	2.67E-12	1.63E-10	8.36E-05	5.58E-05	1.59E-08
Project	MAX	Snowshoe_hare	Benzo(k)fluoranthene	4.36E-06	4.36E-05	2.30E-12	3.57E-07	0.00E+00	1.46E-05	1.66E-05	5.03E-08	3.53E-08	2.09E-06	3.83E-07	9.77E-06	0.00E+00	0.00E+00	3.27E-13	1.99E-10	1.02E-05	6.77E-06	3.70E-09
Project	MAX	Snowshoe_hare	Chrysene	1.57E-06	1.57E-05	2.61E-12	2.27E-07	0.00E+00	3.27E-06	9.42E-08	3.08E-08	4.01E-08	6.58E-07	1.38E-07	1.06E-06	0.00E+00	0.00E+00	3.73E-13	1.27E-10	1.20E-06	8.01E-07	4.80E-10
Project	MAX	Snowshoe_hare	Fluoranthene	1.14E-07	1.14E-06	1.04E-12	7.26E-07	0.00E+00	3.26E-07	4.28E-07	5.68E-09	1.59E-08	4.78E-08	1.00E-08	2.38E-07	0.00E+00	0.00E+00	1.48E-13	4.06E-10	2.49E-07	1.66E-07	9.75E-11
Project	MAX	Snowshoe_hare	Fluorene	4.81E-09	4.81E-08	2.29E-13	1.59E-06	0.00E+00	0.00E+00	3.31E-08	6.96E-10	3.52E-09	2.02E-09	4.22E-10	1.06E-08	0.00E+00	0.00E+00	3.27E-14	8.86E-10	1.19E-08	7.94E-09	3.49E-12
Project	MAX	Snowshoe_hare	Indeno(1,2,3-cd)pyrene	1.80E-07	1.80E-06	3.40E-14	3.38E-08	0.00E+00	1.89E-06	5.07E-08	1.07E-09	5.23E-10	8.64E-08	1.58E-08	6.08E-07	0.00E+00	0.00E+00	4.85E-15	1.89E-11	6.23E-07	4.16E-07	1.83E-10
Project	MAX	Snowshoe_hare	Phenanthrene	5.98E-08	5.98E-07	1.62E-12	1.85E-06	0.00E+00	1.04E-07	2.24E-07	5.80E-09	2.48E-08	2.51E-08	5.25E-09	1.04E-07	0.00E+00	0.00E+00	2.30E-13	1.03E-09	1.11E-07	7.38E-08	3.74E-11
Project	MAX	Snowshoe_hare	Pyrene	2.80E-06	2.80E-05	2.95E-11	1.27E-06	0.00E+00	4.27E-07	8.52E-07	1.60E-07	4.53E-07	1.18E-06	2.46E-07	4.51E-07	0.00E+00	0.00E+00	4.21E-12	7.08E-10	6.98E-07	4.65E-07	2.68E-10